

COMPUTERWORLD

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NEWS IN BRIEF

Effort to License Programmers Fails

LOS ANGELES — The effort to license programmers in California has all but dissolved because of a shift in legislative assignments and a lack of any unified support.

State Sen. Alfred H. Song (D-Monterey Park) who had been chairman of the Senate Committee on Business and Professions, which handles licensing legislation, had proposed the licensing of programmers following a study alleging faulty security during an auditor's primary election in Los Angeles.

But Song got another legislative assignment and no one else took up the effort.

Herbert B. Safford of Santa Monica, executive vice-president of the Data Processing Management Association, said the attempt at licensing was a little premature and it may take five years before licensing can become effective.

But he definitely thinks licensing will take place and that "we should have a way of uniformly certifying people."

He also asserted there was a lack of any support from professional organizations.

IBM Modem 'Integratable' And Priced Competitively

WHITE PLAINS, N.Y. — IBM has an "integrated modem" operating at 1,200 bit/sec that can be installed in the 2701 line adapter, the 3735 programmable terminal and the new 3705 communications controller. The device is priced at levels offered by AT&T and independent suppliers.

The modem can operate on both leased and dial-up lines and features an auto answer capability. Auto dial is optionally available on the 3705 and 2701.

Monthly rental starts at \$15 for private lines and \$20 for dial-up facilities with purchase prices of \$525 and \$700. The modem for the 3735 and 2701 will be available in July 1972, and for the 3705 in March 1973.

On the Inside This Week

Guide Meeting to Focus
On Non-IBM Software — Page 4

Unusual Problems Encountered
By Shared Municipal Data Center— Page 8

Non-DAA Interconnection
Predicted at CSMA Seminar — Page 19

Study Sees Memory Market
Doubling by 1976 — Page 39

Communications19
Computer Industry39
Editorial10
Financial45
Societies12
Software/Services13
Systems/Peripherals15

Opens Next Week

Afips 'Optimistic' About '72 SJCC

By Edward J. Bride

Of the CW Staff

ATLANTIC CITY, N.J. — A highly varied technical program and a surge of last-minute interest from exhibitors may help draw 15,000 to 20,000 computer users and technicians here next week for

the Spring Joint Computer Conference, officials from the American Federation of Information Processing Societies (Afips), said.

The semiannual JCCs are still experi-

Additional coverage starts on Page 21

encing economic problems common to the DP industry, but officials are "highly optimistic" about this conference, to be held May 16-18.

The technical program, with only three regular panel discussions, will feature 130 papers, almost double the normal, officials noted.

There will also be special presentations for computer users, including a clinic on computer contracts Thursday morning, and two evening sessions Wednesday, one on program documentation and the other on research in a university setting.

The exhibit hall is expected to feature about 150 organizations in some 300 booths, Afips said. This represents a continuing drop in both the number of companies involved, and in the average investment; two or three years ago, companies would lease an average of more than three booths each, while this year it is about two.

'One per Day'

In the last two weeks, a spokesman related, an average of one new exhibitor per day has signed up, bringing the preliminary total to 142.

Predictions on the financial viability of the JCCs have been both gloomy and optimistic over the past several months, but Afips is confident the 1972 SJCC can still be profitable.

Those most interested in JCC profits are
(Continued on Page 2)

Get the Vote



(CW Photos by F.J. Piasta)

Telephone workers at National Election Service headquarters in New York learn the county and precinct voting results during primaries. Keypunchers then transfer vote counts to cards with error rate of under 1%. Twin 360/50s process the returns. The output to the news media is then monitored. Story and other photos on Page 3.

Itel 370 Lease Plan Saves Up to 60% Over 8 Years

By a CW Staff Writer

SAN FRANCISCO — Itel is now offering a Packaged Lease Program on IBM 370 equipment that gives the user the same type of discounts that were available at the height of 360 leasing.

With the plans, which involve leasing a 370 with Itel peripherals, the user can get a discount of up to 15% over what he would pay in IBM rent on a three-year lease; a discount of up to 40% on a five year plan; and up to 60% off on an eight-year lease arrangement.

In dollar figures the savings can be huge. On a four-year lease of a 370/135 with 96K of memory and eight 7330 (the Itel 3330-equivalent) disk drives the savings would be \$5,600/mo; and on a 165 with 2 Mbytes and 16 spindles it would be \$41,000/mo on an eight-year lease.

Previously, almost all leases written for IBM 370 equipment were full payout plans where the user paid the full price of the equipment over a five- to eight-year period.

Savings Depends on Lease

The new three- to eight-year lease plans are available for any of the presently available 370s and the amount of savings depends on the length of the lease; the type, model and configuration of the 370 system; and the type and amount of Itel peripherals used with the system.

The more Itel equipment — both disk systems and main memory — used with the system, the greater the discount.

The renewal terms under the plans are "very liberal," according to Itel.

For example, a user can renew on a month-to-month basis at the end of the set period, and continue to receive the same discounts.

If the user renews for a full year, however, he receives an additional 15% off his lease price. The second and third year he renews, he also receives an additional 15%.

The plan includes purchase option plans

which are described as "extremely liberal," even though the company would not disclose details.

A user can terminate the agreement after one year, but the charges are rather steep.

(Continued on Page 2)

FTC Blasts EDP School Advertising

By E. Drake Lundell Jr.

Of the CW Staff

WASHINGTON, D.C. — Three major chains of computer programming schools were cited last week for "deceptive and unfair" advertising and sales practices by the Federal Trade Commission (FTC).

The commission was careful to note, however, that its proposed complaint did not question the quality and content of the training itself.

The FTC action was quickly branded as "another of the all too frequent 'wave the club and make headlines' approach to solving problems," by William Norris, president of Control Data Corp., whose Control Data Institutes were involved in the action.

Spokesmen for the other companies mentioned — Lear Siegler Career Centers and Electronic Computer Programming Inc. (ECPI) — withheld comment until they had more time to study the documents.

The commission also said it may order the three firms to refund tuition fees to present and past students who couldn't

(Continued on Page 2)

FTC Hits Advertising, Sales Practices of DP Schools

(Continued from Page 1)

find work after taking the courses.

The commission said it intended to file complaints against the three alleging that the following typical claims are unfair or deceptive "because there is no reasonable basis to support their validity."

- Graduates of Control Data Institutes will qualify for data processing positions at salaries that match or exceed the salaries of recent college graduates.

- There is an urgent need or demand in the field of DP for graduates of Lear Siegler Career Centers.

- ECPI schools each year place thousands of their graduates as computer programmers.

The commission also alleged that the companies used advertising and sales practices which "a reasonably prudent person

should have known were deceptive or unfair in order to induce persons to pay over to the firms substantial sums of money to pursue courses of instruction whose validity . . . for future employment was virtually worthless."

The companies' failure to make or offer refunds to students who couldn't find employment for which they were trained "is unfair," the Commission stated.

'Figures Secret'

Furthermore, the FTC action alleged that the companies failed to disclose the percent of the graduates of each school who obtained employment; the employers that hired such graduates; and the initial salary of the graduates.

This information, FTC said, would be likely to affect the potential student's decision to

enter the school.

Other allegations from the FTC include:

- Placement percentages were misrepresented.

- The companies' placement offices did not schedule employment interviews as represented.

- Courses offered by the companies did not prepare for high-level programming positions as represented.

- Control Data and ECPI advertisements deceptively represented that a college education was not necessary for placement in the DP field.

The proposed commission orders would prohibit the alleged misrepresentations and require the firms to disclose their placement percentages, employers hiring graduates and the starting salaries.

The firms presently have 10 days from the date of the pro-

posed complaint (May 2) to enter into consent negotiations with the FTC in which they would admit no guilt but promise not to engage in such practices in the future, the FTC said.

If the firms do not enter into consent negotiations, the FTC would then file a formal complaint which would be heard by FTC examiners and then the five FTC commissioners and possibly the courts if the firms fought the decision of the commission.

In all, the FTC said the companies operate or franchise around 130 schools. Of these, CDC operates 18 schools directly and has eight franchises; Lear Siegler has 16 company-owned schools and ECPI operates seven schools and has 80 franchises.

The average tuition for courses at the schools, the FTC said, is between \$1,000 and \$2,500 and

the schools offer courses for computer operators, computer programmers and computer technicians.

In his response to the charges, Norris said "the issues which the FTC is addressing with Control Data could have been resolved over a year ago by meeting with us as well as other vocational schools and thus we could all now be enjoying the benefits from such a meeting."

"It appears that the FTC may attempt to penalize the private computer vocational schools because of the difficulty some graduates experienced during the last two years in finding jobs — difficulties which appear to be directly related to the slowdown in our whole economy."

"I am even more concerned that the FTC may create policies applicable to private education which would discriminate against such education in comparison with public universities and other tax-supported schools."

Afips Optimistic About Next Week's JCC

(Continued from Page 1)

the DP societies, which rely on financial distribution from Afips as their chief source of revenue. The senior of these societies is the Association for Computing Machinery, and ACM President Walter Carlson does not share the Afips optimism.

Carlson is currently involved in a three-month series of editorials entitled "Unfinished Business,"

appearing in the ACM monthly *Communications*. In the May issue, he claims "the 1972 SJCC is budgeted to produce the first financial loss at a JCC in Afips history."

ACM has called for a "thorough overhaul of Afips operations," Carlson said, and "possible return of some of Afips responsibility to the member societies."

Afips denied that a financial loss is unavoidable, but did concede that both revenue and expenditure predictions would not be met. Funds are distributed to the societies on a fiscal year basis, the spokesman added, and not after each JCC.

To further meet the needs of the JCCs, Executive Director

Bruce Gilchrist eliminated the Afips staff position of exhibit director, formerly held by Don Cruzen, and has given this function over to two separate groups, "communications and exhibitor relations" and "operations."

To try and put the current computer industry challenges into perspective, Afips President Keith Uncapher will deliver a "state of the industry" address Wednesday morning at 9, in the main ballroom of the Convention Hall.

In reference to the past heyday of the computer industry, Uncapher said his address would deal with the 1970s and the "ability of our industry and profession to respond constructively to a new set of conditions."

Registration, Program

The registration and activity schedule for the SJCC begins Monday at 5 p.m., at Convention Hall, continuing until 9 p.m. Registration on conference

days will start at 8 a.m., and continue until 6 p.m. Tuesday, 6:30 p.m. Wednesday and 5 p.m. Thursday.

Tuesday's keynote address by IBM Chairman T.V. Learson will commence at 9 a.m. Exhibit hours begin at 9:30 a.m. daily, and continue until 6 p.m. Tuesday, 6:30 p.m. Wednesday and 5 p.m. Thursday. The Afips presidential address on Wednesday will be at 9 a.m., and will be the only activity scheduled for that time.

Technical sessions follow a varied schedule, but the program in general begins after the keynote address Tuesday, after the Afips presidential address and at 8:30 a.m. Thursday.

In addition to the exhibits and technical program, there will be a conference reception Tuesday from 6-8 p.m., an organ recital Wednesday from 6:45-7:45 p.m., and the science theater daily, which takes place within the exhibit hours.

Grads Have Problems

"Many graduates of leading colleges and universities throughout the country experienced difficulty in finding jobs in the last two years. I hope the privately owned computer schools will not become a stalking horse because their students experienced comparable difficulty," he added.

"It is not feasible to respond to all the allegations contained in the FTC complaint," Norris added, "however, there is one allegation in the complaint that is so erroneous that it must be corrected now before it is misconstrued by millions of young people deciding on a career, viz., that we have deceptively represented that college education was not necessary for placement in the field of electronic data processing."

"It is a fact that we have graduated and placed thousands of non-college graduates from our Control Data Institutes," he said.

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Forecasting Expanded

Special to Computerworld
MELBOURNE, Australia — The Federal Bureau of Meteorology plans to streamline its operations with a centralized forecasting service in Melbourne.

Forecasts for all services, including aviation, will depend on a central computer here with regional forecast centers in all Australian States and Territories and the Territory of Papua-New Guinea doing preparatory work.

Cutting Costs in Alaska Big Deal

ANCHORAGE, Alaska — Alaska's largest restaurant plans to use a computer to help plan menus to assure that its patrons get tasty, balanced meals at the lowest possible cost.

The "restaurant" is the Greater Anchorage Area Borough School District and the patrons are the 35,000 youngsters who eat lunch — 2,614,295 lunches a year — at the district's 50 schools.

Plans Buses

The school district also operates the largest bus line in Alaska and will use the same system to assist in planning the most efficient routes for more than 100 school buses that travel an estimated 1.3 million miles each year across the 80-mile-long district.

"Our prime business is educating youngsters," said William W.

Klingler, assistant superintendent for facilities and finance.

"Therefore, the more efficiently we can operate our support services, the more resources we can spend on actually educating our children."

"Because of our steadily increasing size and the costs of running a large school system, we must become more scientific in our operations," Klingler said.

By keeping track of the fluctuating prices of various food commodities, the IBM 370/135 will quickly sift through alternatives to find the best nutritional "buy." The system will print a list of suggested foods to purchase, the quantity needed to prepare each meal for the district's students and will prepare a daily menu that assures a balanced meal composed of foods that go well together — and at the least possible price.

User Can Save 60% on 370 Lease Plan

(Continued from Page 1)

For example, if a user terminates after three years on a five-year plan, he has to pay 48% of the original cost of the equip-

ment; if after the fourth year, the charge is 25% of the original equipment cost.

But a user can upgrade to

ently installed or additional ITEL peripherals.

ITEL will also make it easy for any user to get on its Packaged

370/145 with 208K IBM memory and 12, 7330 spindles			
Term	% savings/mo	\$ savings/mo	approximate IBM monthly rent
3 years	2%	\$540	\$27,000
5 years	36%	\$9,700	\$27,000
8 years	45%	\$11,150	\$27,000

another 370 (or even downgrade to 360 equipment) with minimum charges. And the upgrade will not cause any cash outlay to the user — the charges will be added to his new lease.

Generally, these charges would only add approximately 1% to the new lease, ITEL said.

In addition, any termination charges can be applied to the purchase of ITEL equipment. Therefore, if a user has to pay a \$100,000 termination charge, he can apply that \$100,000 to pre-

Lease Plan by reimbursing the user for any charges he incurs getting on the plan, i.e. charges for terminating IBM 3330 equipment on a fixed-term plan.

ITEL will also continue to offer rental credits for any time a customer incurs losses due to hardware malfunctions, as it does on the leases it writes for the IBM 360.

The firm said it would also take older equipment as trade-ins for users who own their own equipment.

370/155 with 2 Mbytes ITEL memory and 8, 7330 spindles			
Term	% savings/mo	\$ savings/mo	approximate IBM monthly rent
3 years	6%	\$2,700	\$45,000
5 years	35%	\$15,750	\$45,000
8 years	54%	\$24,300	\$45,000

Team of Thousands Gets Election Facts to Networks, Other Media

By Frank Piasta
Of the CW Staff

NEW YORK — Ever wonder how the nation's new media can come up with accurate voting results only minutes after ballots are counted in the national elections and the presidential primaries?

The News Election Service (NES) here stresses speed and accuracy while providing the three major television networks and two major wire services with the data for early election results.

NES was organized after the 1964 pri-



Executive Director J. Richard Eimers checks control figures during vote count.

mary elections by ABC, CBS and NBC and AP and UPI. Costs are shared equally by the five members. Only eight people are employed year around, but temporary hiring at national election time can swell the figure to 145,000.

During the current series of presidential primaries, a team of nearly 7,000, in-



Jeffrey I. Stoll, systems manager, and Robert Flaherty, director of operations, interface frequently as the counting progresses.

Information System Curing Paper Disease

LITTLE ROCK, Ark. — A computer-based information program in the Baptist Medical Center System makes it easier for doctors, clergymen and friends to visit patients, and, at the same time, relieves hospital personnel of an expanding administrative workload.

Using a computer with CRT terminals, the 590-bed Medical Center System is in the second year of a five-year plan to develop a total hospital information system.

The CRT terminals provide patient information obtained only manually before and on a more-up-to-date basis.

For example, a doctor beginning his day's rounds can obtain a complete patient listing by entering his ID code on the terminal's keyboard.

Similarly, a terminal at the information counter is available to visiting clergymen. The computer can scan admitting data provided by patients and identify for a minister all members of his church and their room numbers.

"But these are only early byproducts. We are working to automate all the paperwork, from the day a patient is admitted to the day he is discharged," according to Don Moore, director of computer services.

cluding reporters at the local precincts and operators and programmers (with twin 360/50s and a 360/20), work 'round the clock' to get the facts.

DP facilities were located in the Group Health Insurance, Inc. building, where NES uses equipment normally part of the insurance company's installation.

As soon as local vote counts are available, results pour into the New York headquarters via 110 telephone lines. Before the job is finished, approximately 7,000 calls will be received, 90% of them between 8 p.m. and midnight.

Tallies from precinct and county reporters are punched into 80-column cards, verified and transmitted down 14 stories over an IBM 1013 to the computer room where cards are repunched. The punched cards are read into both of the 360/50s where the data is completely verified and then included in totals kept by precinct and county.



(CW Photos by F.J. Piasta)

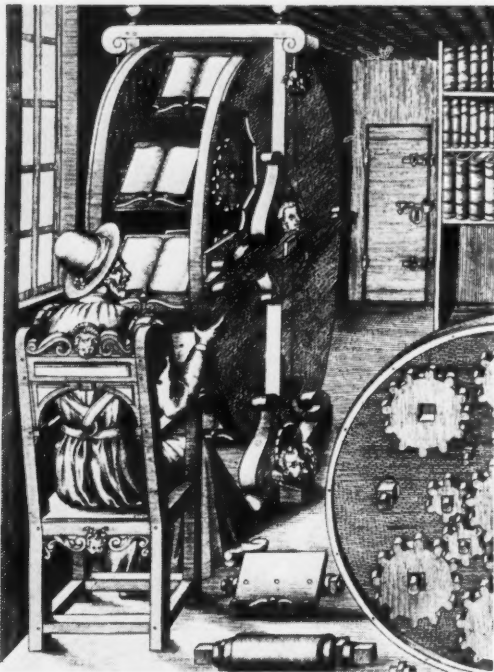
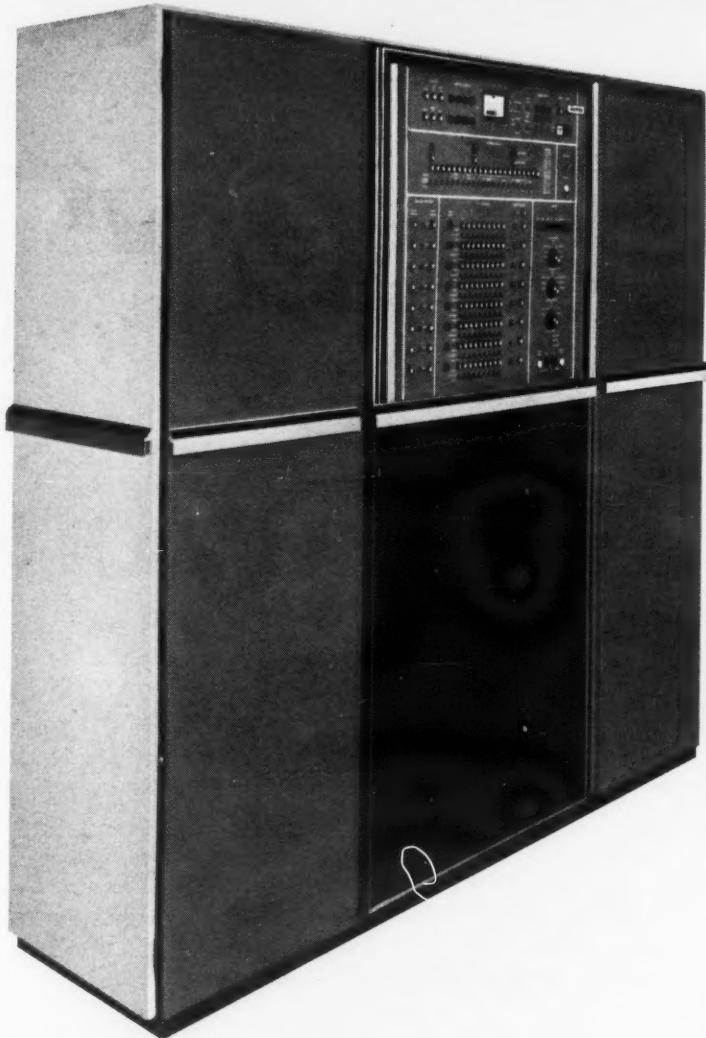
The operation of the error desk can be compared to a fire department — periods of relative inactivity punctuated by moments of "heavy action."

The 360/50s operate on the same data simultaneously, so in case of trouble the cutover from one system to the other can be accomplished almost instantaneously.

The results of the tabulations are dispatched over Teletype 28, to the national centers of the five members and to NES regional offices in each state.

Reports are produced at frequent, specified intervals including state totals for each candidate, with separate reports for each party every two minutes, and county/city totals for every candidate every 15 minutes. Tallies for each of the delegates are also issued at frequent intervals.

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To Identify Users' Rationale

Miami Guide Meeting to Focus on Non-IBM Software

By Donald Leavitt
Of the CW Staff

MIAMI — For the first time, next week's Guide meeting will give users of non-IBM software products a chance to discuss those packages and how they relate to IBM software, within the context of a formally organized Guide project.

The External Products Project is expected to be primarily concerned with data base management systems but may consider related software as well, according to Ronald J. Cotyk of Westinghouse Electric, who was named project manager at the last mini-Guide meeting.

Users' Rationale

Stated purpose of the project, Guide President Garland Cupp

of McDonnell Douglas said, is to identify the users' rationale for choosing non-IBM data base products. Findings would "presumably" be passed along to IBM with other Guide input, he added.

Apparently reflecting the longstanding exclusion of discussion of any non-IBM products within the user group meeting itself, Cotyk's project meeting is classified as a Guide Additional Program Session.

The new project has a position comparable to established projects concerned with IBM's CICS, IMS and GIS packages, within Guide's Information Management Group, Cotyk noted. The Miami meeting is particularly important since it will set the objectives and structure of the

project, he added.

Cotyky stressed that the meeting is intended for users and not vendors of "external" packages.

Guide is the IBM-sanctioned user group for large-scale systems such as IBM 705, 1410 or 7000 Series CPUs with at least 20K of core and six tape units, or 360 Model 40 or above, with 64K bytes of storage.

Real Work Needed

The meeting will consider both short- and long-range objectives for the External Products Project. Hopefully, target dates for short-range objectives, and interim check points for longer efforts will be set, so that real work can get underway, Cotyk said.

The structure of the project,

including the organization of committees and the selection of alternate managers, should be relatively easy to resolve, once the basic purposes are set, he added.

Cotyky hopes the meeting will

set an agenda for the project meeting at mini-Guide 34.5, including a definition of what subjects might be profitably discussed, and what information might be needed as resource material for the discussions.

News Wrapup

Canada Insurers Want More DP Use

TORONTO — A group of 10 Canadian insurance companies has formed an association dedicated to the use of standardized computer-based information systems in the insurance industry.

The Insurance Systems Association plans "to provide technical assistance to members and member companies and to investigate and report on systems developments and costs," according to chairman Walter Sutherland.

Through the group, he said, "we hope to see improvements in such areas as costs, training, agency contact, forms design, systems design, problem research, organization and others."

The association plans to expand its membership through invitations to non-member companies.

Codasyl Seeks New Input

PHILADELPHIA — Users who have worked with data base management systems can attend the annual meeting of Codasyl (Conference on Data Systems Language) on Tuesday, May 23.

The Data Base Task Group is seeking "as much input as it can get," particularly about a common data description language, according to Jack Jones of Southern Railways and chairman of Codasyl's Executive Committee.

If the group can arrive at a consensus of what the language should contain, "it would have broader impact on the entire computer community than the work done by Codasyl on Cobol," Jones said.

The meeting will be at the Drexel University Activities Center, 33rd & Chestnut Streets. Advance registrations, costing \$15, are being taken by W. Ronald Block, at First Pennsylvania Bank, 3020 Market Street, 19104.

Aid for Adoption Expected

ST. LOUIS — A computer system might find homes for 40,000 children in foster homes and institutions and insure that the needs of the backlog of children be met within this decade.

This is the feeling of the delegates to the Third North American Conference on Adoptable Children who met here and resolved that federal funds be provided for a national computer count of children.

The Car of His (Its) Choice

LONDON — For those indecisive souls who cannot make up their minds on what car to buy, the pressure may be off.

Programmers at Gordon and Gotch Computer Center have written a "demonstration piece," the Selectacar Service, which relies on a master file in the center's computer. There is data on and performance details of 320 British and foreign cars on the UK market.

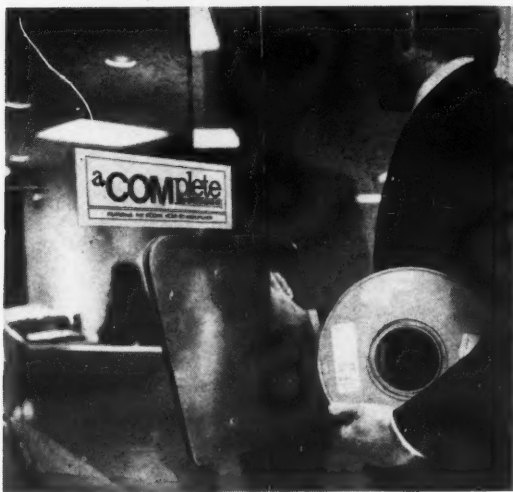
By typing in an inquirer's needs on a terminal an operator can have a short list of the models most closely matching his requirements produced by the computer.

Yale to Honor Cmdr. Hopper

NEW HAVEN, Conn. — Commander Grace M. Hopper, one of the pioneers in the computer industry and internationally known for her work in computer programming, will receive the Wilbur Lucius Cross Medal from the Yale Graduate School's commencement exercises here on June 12.

The medal is awarded annually to graduates of the Yale Graduate School for outstanding achievement. It is named after a former dean of the Yale Graduate School.

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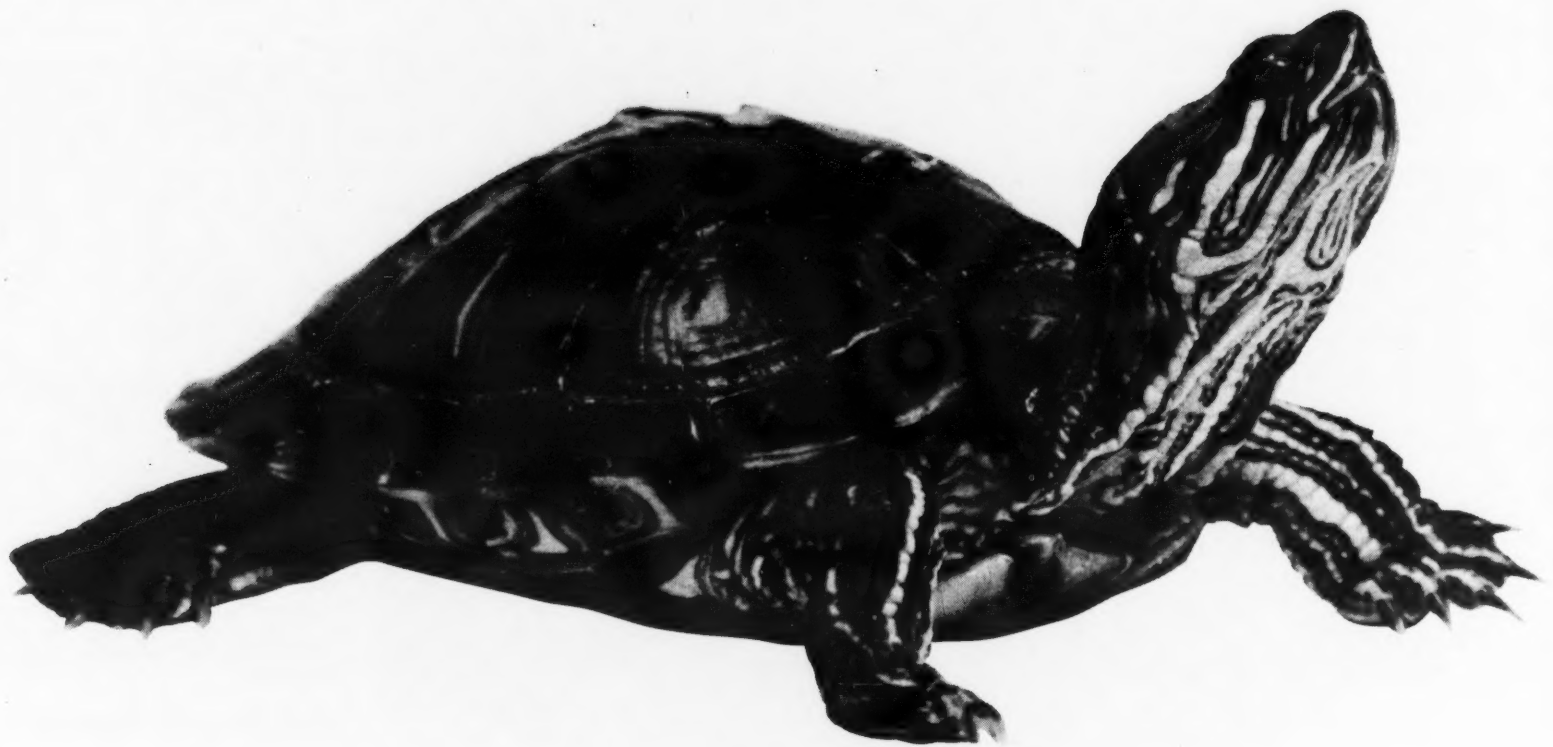
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Study Finds 360 Desirability

Most Users Happy With 370, But Rate Backup Poor

CHICAGO — "Of the over 350 major corporations participating in a recent study, 30% decided not to move to IBM's System 370." This was one of the findings presented to over 200 executives attending The Diebold Research Program's 27th plenary meeting.

The findings of the study of users' experience with the IBM 370 were presented by Basil Iswashyna, senior associate, The Diebold Group, Inc.

Since June 1970, when IBM announced its 370 line, almost 2,000 of these systems have been installed. The 100 companies deciding not to move to System 370 gave these reasons:

- Ten percent of these companies had no need for the expanded capability of the 370; existing machine capacity was adequate for their work load over the near future.

- Ten percent were non-IBM users, particularly NCR and Burroughs users, who

are not moving to 370 because of lack of direct compatibility or emulation.

- Eighty percent were those 360 users who found alternative means of achieving cost/performance advantages equal to the 370. Some found that through financial arrangements with third-party leasing companies on used 360s, it was possible to configure systems which were more effective in terms of cost/performance than 370s.

One of the case studies was that of the B.F. Goodrich Co. Edward J. Jebber, department manager, computer resources planning and control, indicated his company had gone from a 360 to a 370 but is currently returning to the 360, mainly because of availability of attractive financial arrangements on used 360 systems.

Jebber said that even though the 360 performance has not been changed, effective cost/performance due to reduced pricing (as much as 60%) made the use of

360s desirable, if cost/performance is the major criterion.

Jebber also said that since the 370s lack any software advances, many users can stay with 360s. This same factor, however, makes upgrading easier, with no conversion problems.

The study also examines 370 user experience and satisfaction in specific categories. Among them are:

- Systems performance — Most users participating in the study felt that system performance exceeded expectations. The study found, however, that 165 user satisfaction was lower: these are extremely knowledgeable users — and they felt that IBM could have done more to improve system performance.

The users are dissatisfied with the software because they believe improved software is well within IBM's capabilities. They feel IBM should have introduced a new and improved operating system for

370.

- Backup — If the system is down, a user must have backup, an alternate system available from IBM, or an IBM user in a nearby area on which workload can be processed at reasonable costs. Both the 165 and 155 users are dissatisfied with backup availability. The study thought this was because there are not enough 165 and 155 users yet.

Other conclusions of the user study are:

- Most 360 programs will run on 370 with no changes.

- File conversion from the 360 to the 370 is not a problem.

- Operations staff trained on the 360 will not require significant retraining.

- On the average, throughput of respective 370 models will exceed expectations.



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NASHUA



In a computer room at a Puerto Rico engineering firm, Chief Engineer Herman L. Guillermetty (left) and Pedro B. Ortiz use a computer to design highways for Puerto Rico.

Engineers Smooth Road-Building Task

SAN JUAN, P.R. — If it weren't for the computer, Puerto Rico's new superhighways might still be on the drawing boards.

The island is midway through a five-year, \$680-million highway construction program and computers have figured in every mile.

Most of the current projects are under contract to private engineering firms on the island. The chief engineer of one of the firms, Herman L. Guillermetty, said that, beyond a guess of "thousands of hours," it would be impossible to determine exactly how much time his computer has saved him and his company on highway design.

Guillermetty and Ortiz designed two segments of the San Juan-Ponce toll highway — the 10 miles between Rio Piedras and Caguas and the 25 miles between Salinas and Ponce.

"The computer is a quick and inexpensive proving ground," Guillermetty said. "We use it to test our designs against standards we specify ourselves in a digital terrain model we build ourselves inside the computer."

"Once digitized, terrain data can be used for small line adjustments or major line shifts. When design changes are necessary, we can make them easily and economically."

The digital terrain model in the IBM 1130 is an engineering cross-section of the proposed highway route.

Engineers can vary their design almost infinitely by changing the specifications on punched cards and feeding them into the computer. The computer will automatically adjust other parts of the highway design to compensate for changes to one part.

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THE LEADER IN LEASING

Playing Politics in Government Agencies

Problems Are Unusual, But 'Open Mind' Is a Necessity

By Molly Upton
Of the CW Staff

MONTEREY PARK, Calif. — "Governmental agencies have to realize this (sharing) is the only way they're going to really be able to use computers," according to Sam Norris, manager of the San Gabriel Valley Municipal Data System (MDS). Thirteen cities participate in the system, which was originally designed to accommodate about 19 municipalities.

Norris knows the benefits of a joint system but he also knows that getting a shared municipal data center up and running, and keeping it running, can involve problems not necessarily encountered by a private bureau or by the DP center of one city.

Political Problems

In setting up a shared system, political problems must first be tackled, Norris said. "Before you get into technical con-

siderations, you have to find a common way to meet and make decisions. If you talk about two agencies that have a long-standing rivalry, they're just never going to make it, because it will permeate any relationship they have," he observed.

"The trick is to have an open mind as to who you can cooperate with. Look to different types of agencies, such as a county, school district and a city. The

Spotlight on Sharing

accounting and payroll techniques in government agencies are almost the same," he noted.

The typical city councilman doesn't know much about computers, Norris said. But Leonard G. Soper, a DP professional, became president of the MDS board, and "proved to be a real bonanza" in pushing

the shared-use concept to other councilmen.

"One of the biggest problems we have in selling cities is the bad reputation DP has in the cities, because they have made decisions in the past without adequate study or staff commitment. They will buy the hardware, but never agree to put the people in.

"For instance, the thought of a city hiring a 28-year-old analyst and paying him as much as a police chief is totally unacceptable to the city," Norris said.

There is the problem of conveying what is meant by long-term development of a DP system. "To a city person a big project is laying a street that takes 120 days and is a fixed-price contract. He has no concept of a cost type of contract that runs over three years," according to Norris.

"You're selling a future type of thing," he added. "Asking for \$30,000 in return

for a system in 1972 didn't sound very good back in 1968."

MDS currently sells time to a private firm to supplement income. Norris said if there were 19 cities, financial problems would be lessened. MDS serves a population of about 450,000, and Norris would like about 700,000.

Norris does his best to keep the non-DPers informed with seminars, Saturday morning clinics and progress briefings to city councils.

By dealing with councilors, rather than city managers, MDS has access to other council members, and thus can involve the legislative people directly in the decision-making process.

The representative board of the cities operates on a one city-one vote rule, but Norris admits that if a bigger city wants something, it tends to swing a little more weight.

User Groups

There are user groups in each applications area, which meet to determine what programs they would like developed. "They say they'd like something, and we will tell them how much it will cost. We work for them, and our people know it," Norris said.

Although the cities had about two years to consider the shared concept before joining, it took about a year-and-a-half to line up 10 towns before development started. Membership is on a year-to-year basis.

A grant from the Carnegie Corp., which underwrote the cost of an in-depth feasibility study, conceptual systems design and projected operating costs, was significant in getting the project started, Norris said.

The cities saw that "at least a portion was going to be paid by someone else," he noted.

But the benefits from a shared system can outweigh the extra effort involved in negotiating with political factors and handling financial problems.

Top programmers are attracted by the complexities involved in designing a shared system, Norris said, and "in many ways we're clearly pushing the state of the art." The MDS environment removes the talented DP types from bureaucratic machinations of city functions, and vice versa, he stated.

"The center can use high volume, on-going production-type jobs to pay the overhead, thus permitting the programmers to develop what I think is one of the true information system capabilities of using the data. That's the type of thing the cities can never do on their own," Norris explained.

Grants from various agencies are currently underwriting a portion of the development work. "We do pretty well, as we're quite unique," he said, adding that almost all grants are pushing the concept of shared use of data and multiple agency development, which is "right down our alley."

"Our systems are clearly cost effective when compared with in-house or even service bureau operation. We can beat most of the service bureaus because we're specialists. Our guys are all specifically trained to deal with municipal problems."

Billing is on a use basis, with each municipality paying for the functions it uses, e.g. water billing, according to the number of accounts or population.

The software is highly parameterized, all designed specifically with multiple organizations in mind. The system can handle monthly, semimonthly, weekly and bi-weekly payrolls, although the tax tables are different for each, Norris noted. The system can serve "any typical city with very minor changes. We think it's a transferable system," he added.

The system is modular, so retrieval is possible from multiple files, and data can be pulled into one working base.

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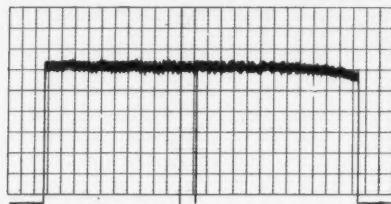
Earlier this year, we picked twenty-five 3200 fci premium tapes at random and tested them for output.

The tapes were by BASF and four other major makers. The criterion was the National Bureau of Standards Amplitude Reference Tape.

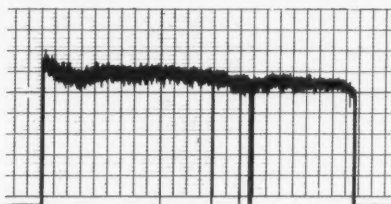
Test results? BASF/2000 A.D. was far and away #1 in uniformity – bit to bit, reel to reel.

BASF/2000 A.D. was also #1 in output. Our tapes were the only ones above the Standard 100% line.

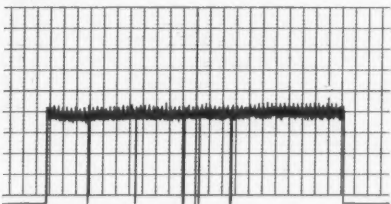
If you look right, you'll notice four typical charts and traces from the test. You can see others in a special booklet we've just prepared. (It's yours for the asking.) You'll also see the *reason* for our double win:



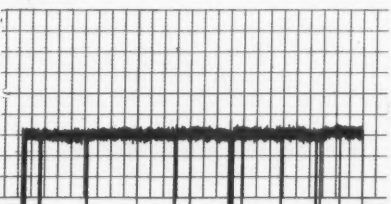
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Computer Products



Editorial

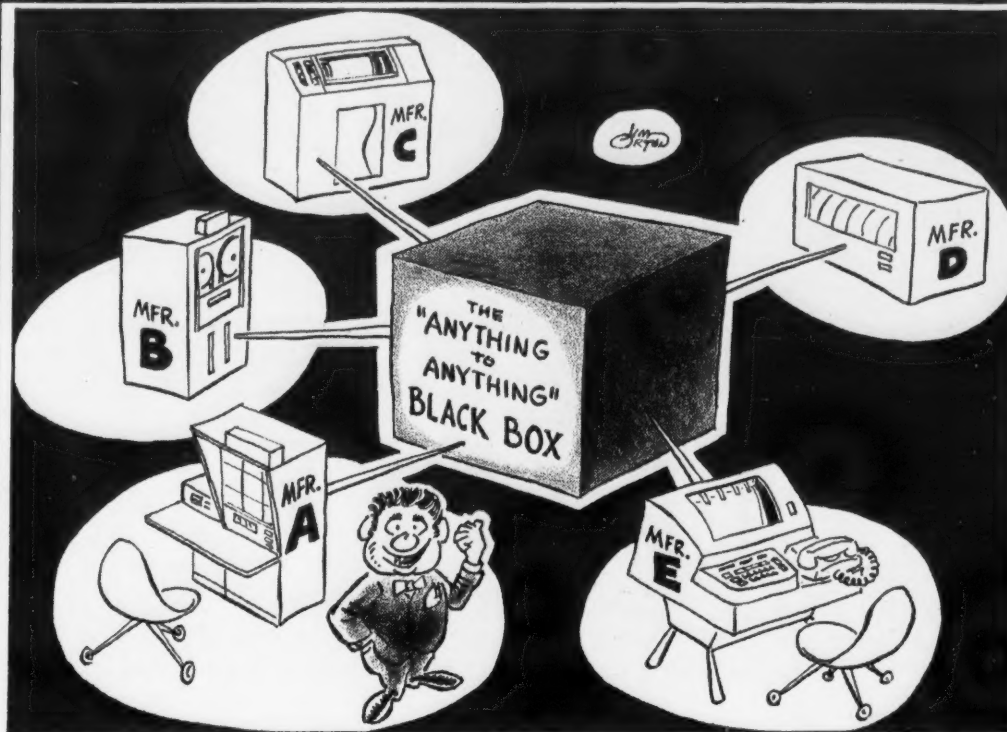
Apples and Oranges

The Federal Trade Commission has cited three of the major chains of private computer schools for allegedly deceptive advertising. Other schools may be cited in the near future, according to the FTC.

It is important for *Computerworld* readers, as prospective employers of graduates of these schools, to remember that the *quality* of the training is *not* in question in connection with the FTC action.

The distinction is important because the value of these schools has been questioned by various DP people, and the FTC action might seem to lend weight to their argument. It does not, because the FTC is only concerned with the way these schools attract applicants, not with the way they screen them and train those they accept.

So each school must still be judged on the reputation it has earned.



'I Like It--I Like It!'

And the Compiler Still Doesn't Work

Project That Failed Includes Unspent \$200,000

By Miles Benson

Special to Computerworld

This is my favorite computer story.

It involves big money, big hardware, high-level maneuvering and a strong flavor of chicanery.

Because of this, I'll disguise the players. I'll call the user company, a large diversified firm, Diversico, and call the hardware vendor, well known for its marketing prowess, Marketronics. The software company, a highly professional group, will be known as Softpro.

The focal point is a particular compiler for a particular language. To ensure the secrecy, I'll call it Plantran.

To begin, a Marketronics 4000 Series computer at Diversico has a sufficiently high workload, and the firm is thinking about ordering another machine.

Diversico's Problem

Over in Diversico Aerospace, though, there is a problem. The Plantran compiler which came with the 4000 computer works badly. Diversico Aerospace has been working with Marketronics, trying to get the compiler fixed, with no luck. Plantran isn't an everyday programming language, and Marketronics just doesn't seem to care that much.

There is a reason Marketronics doesn't care, the rumor says. Softpro supposedly built the compiler under a loosely written contract from Marketronics, and the contract didn't provide for proper finishing touches and maintenance.

When Softpro refused to finish the compiler without more money, Marketronics told Softpro what to do with its request, and in the ensuing contractual pushing and shoving nothing resulted but animosity.

Diversico Aerospace management, looking for a crowbar with which to pry Marketronics a little harder, found out about the order for the second 4000 computer. And now the action begins.

Diversico Aerospace talked Diversico management into mak-

ing the second 4000 order contingent on getting an improved version of Plantran. It approached the local Marketronics rep with that offer.

There were a lot of options open to Marketronics at this point. I'll probably never fully understand why it chose the one it did. After a few days of high-level headscratching, the Marketronics rep proposed that if Diversico ordered another 4000, Marketronics would give it the money to fix up Plantran.

Think about that a minute. If Marketronics really cared about Plantran, really wanted to offer it in its software product set, wouldn't the firm get it fixed up itself? Why pay someone else to do it? Handling things in this way, the fixed-up Plantran still wouldn't belong to Marketronics.

The only explanation I've been able to find is that the Softpro rumor was true: there was so much animosity between Marketronics and Softpro that Marketronics just didn't want to touch that Plantran compiler again. Maybe there's a better explanation.

Signed for Machine

But Diversico bought the idea, and got a price from Softpro to fix Plantran, and signed up for the second 4000. The price was \$200,000. You can see what kind of shape Plantran was in.

But several months passed before Diversico went to Softpro to sign a contract to fix Plantran.

And the plot thickens. Softpro, its executives say, has broken up the Plantran team in the intervening months. To construct a new team and do the task will cost more money. Fixing up the compiler is now estimated at \$350,000.

The effect on Diversico was electric. The shock ran all the way up to the board of directors. Softpro's price, they decided, is too high, and the tactics leave a bad taste. (Maybe that's why Marketronics had refused to go back).

Meanwhile, that \$200,000 in Diversico's pocket was burning a hole. But it didn't seem to matter much, because there was nothing to spend it on!

And then someone asked, "or is there?" There are lots of software companies in the world. Diversico set out to find one to somehow deliver a Plantran compiler for \$200,000.

The search took awhile. Diversico's computer types spent a lot

of time and money talking to software companies about Plantran. Several companies made bids. Some came on-site to inspect the Softpro compiler or to try bootstrapping a Plantran compiler from another computer. But none could do the job for \$200,000.

I'd like to give you a nice ending to this story. But remember, this is a "project which failed."

Marketronics still makes com-

puters. Diversico still uses them. Softpro still builds software. But there is no Plantran compiler on the 4000. Diversico simply never found anyone to do the job for the money it had offered.

But what worries me is that \$200,000. Whatever happened to it? Someday, with the aid of a sharp accountant, I'd like to sneak a look at Diversico's books. That \$200,000 is probably still floating around in there, somewhere. But where?

Letters to the Editor

GSA Guides Separate 'Wheat From Chaff'

The report on General Services Administration standardization of DP titles [CW, April 19] reminds one of the biblical admonishment: "many are called, but few are chosen."

The DP title of "computer software specialist/system engineer" and its attendant competency requirements must invariably result in criticism from conscientious software management.

Personal experience and association with a multitude of clients, employers and DPMA chapters coast-to-coast during the past eight years justify the conclusion that individuals meeting all the qualifications described are conspicuously unavailable.

Other than my former associates at CEIR, I have been in contact with no one else meeting the listed qualifications. I suspect those of us within the industry who have designed and programmed one or more complete operating systems and/or executives (or who have even been involved in the development of language translators, preprocessors, emulators and sorts) could all be assembled in one large meeting hall.

DP management generally is dissatisfied with operating system (and application) perfor-

mance because of the limited availability of individuals meeting the GSA standard. Overall ambiguity of title, responsibility and competency prevails.

The GSA standards for software personnel are necessary, regardless of the "waves" created. They begin to "separate the wheat from the chaff."

Robert R. Cromer, CDP
Computer Dimensions, Inc.
Detroit, Mich.

2-Year Grads Eligible

The General Services Administration has excluded the graduates of two-year technical institutes and two-year junior colleges with the standardization of new GSA guidelines.

The junior institutions have produced capable computer programmers. For example, the course work in computer science technology at Texas State Technical Institute requires 62 trimester hours of computer programming plus additional related work for a total of 90 trimester hours. Many courses are heavily structured toward an applications environment.

I feel the GSA should reconsider the requirements for the positions of programmer and coder/programmer aide. The criteria should be based upon programming ability.

Ron Carswell
Program Chairman
Computer Science Technology

Texas State Technical Institute
Waco, Texas

Graduates of two-year technical schools would be eligible for jobs as coder/programmer. Their education would also be considered as experience, with one year of college equal to nine months of experience. Ed.

A Cause to Pause...

Having read Michael F. Smith's "Viewpoint" article [CW, April 5, "User Lauds IBM's Present Software Strategies"], I gasped and then reread it to make sure my eyes hadn't given out on me, and then gasped again. My only possible reaction is one of incredulous amazement at such an attitude. God help Smith's consulting clients.

L.A. Welke

International Computer
Programs, Inc.
Indianapolis, Ind.

Computerworld Back!

Congratulations on the first issue [CW, April 19] of your new journal, *Computerworld*. It is a very welcome replacement for what I have been receiving for some time under the name of *Uterworld*.

Roger L. Fisher

Seattle, Wash.

Letters should be addressed to: Editor, *Computerworld*, 797 Washington St., Newton, Mass. 02160.

Readers Want Respect for Student, Teacher and Parent

In reading the reader reviews of the school report printed in The Taylor Report on April 12, I was not surprised that they had a number of points to object to in the design of the report. As one reader put it — the difficulty was not in finding 12 errors — but guessing which 12 errors I was asking about!

However, as well as the problems of truncated fields, improper alignment, inconsistent legends and other technical points, an unmistakable demand for giving proper respect to the various people involved in the system could be clearly seen. This delighted

The Taylor Report

By
Alan Taylor, CDP



me, and also suggested the carefully made suggestions should have more publicity.

Many respondents pointed out the failure to punctuate between the last name and the first name of the child, thus making it ambiguous as to whether the student was Taylor Alison or Alison Taylor. They noticed the failure to indicate whether the members of the faculty were Mr., Miss, Mrs., or Ms., and the failure to give them initials or full names.

They pointed to the assumption that the parent would have full knowledge of all the technical details of the school's educational system, including the ability to understand why various labeled fields were not filled in, and what unlabeled fields already filled in were.

They also gave suggestions — which is why I think you would like to read some excerpts from the letters, together with a list of errors.

School Report Analyzed Field by Field

School Field

- Should be pre-printed
- Should identify town
- Should include contact-point

Student Field

- First name should be first
- If last name first, should be punctuated to be readable

H-RM, I.D.-NO: Y.O.G.; Q.P.A.; G.P.A.; IRS No Fields

- Name should not be abbreviated
- Abbreviations should be listed in key

Previous Credits, Q.P.A., G.P.A. and Various Attendance Fields

- Blank fields should be explained
- Zero fields should be printed

Q.P.A. and G.P.A. Fields

- Values should be calculated and printed

Course Name Field

- Names should not be so drastically abbreviated
- Fields should use available spaces

Course Number Field

- Same number used for two courses

Teacher Name Field

- Names should include title and initial
- Printing should not be abutted to course number

Grade Fields

- Heading should be given

- Spacing should be adequate
- Number of fields should be compatible with the five sets of attendance summaries

- Data should agree with key
- Blank fields should be explained

Verbal Comments Field

- Heading should be accurate
- Invalid coding by staff should not lead to lost comment
- School should check comments before accepting report from suppliers

- Comments should not be truncated arbitrarily
- Comments should not be repetitive ("polite and cooperative" becomes boring)

- Comments should be punctuated
- Comments should indicate which period they apply to

- Comments should indicate relationship with previous periods
- Comments should not discourage subject-related remarks

Grade Legend Fields

- Apostrophe should be used in "child's"
- Legend should match usage (see also grade field remarks)

Missing Fields

- Date of report
- Explanation of other than grade legends
- Parent receipts — return comments

D= 'Didn't Make It?'

• Under Attendance Summary A, T and D are not defined. Unless defined, abbreviations should only be for internal use. I assume A=Absent, T=Tardy, D=Dead? or A=Attended, T=Tried to, and D=Didn't make it? Perhaps she did consistently excellent work for 11 units year to date and met minimum requirements once (see grade legend).

• Are the Teachers Mr., Mrs., Miss or Ms.? I'm sure one does not call up the Winch Park School and ask for George.

• In the narrow columns, which I assume are some sort of units of time across and grades down, there are too many time-grade periods as compared to Attendance Summary. The columns are not wide enough to correspond to the number of letters in the Grade Legend.

Charles A. Bernzweig,
White Plains, N.Y.

Institution Careless

My comments per school report, "Can You Find 12 Wrong With This School Report?" — No, but I can find 14 (at least).

• School name should be pre-printed.

• Identification of period covering report, 1-2-3, etc. should always be pre-printed.

• Why are quality/grade point averages not calculated? Also a legend is needed to explain/define the abbreviation and meaning of each to the reader.

John Lenhardt, El Paso, Texas

Parents Assumed Aware

Looking at the form and its contents on an overall basis, two things become immediately apparent:

• The form, and its preparers, assume that each parent is totally aware of the primary or secondary education terminology, classes, personnel and procedures.

• Considering that there normally exists too little dialogue between the parents and the school system, this school report could serve a needed communication link between parent and educator. However, one's immediate, and perhaps only, reaction upon scanning the report is the summoning of Alison and demanding why she received a D in "FR 8 TRI," whatever that is.

Looking at the form in detail, the following flaws are detectable.

• In the field identified as "STUDENT," is the student's name Taylor Alison or Alison Taylor?

• In the row of field beginning with "H.R.M.," going to a double row for headings would permit more meaningful headings — "Home Room" instead of "H.R.M." Form design is sloppy — the room number over-runs the right side of the box.

• In the report:

○ Why is it necessary to abbreviate the course names when there are 3 lines of 13 characters each to describe the name of the course?

○ The grade legend shows possible grades of A, B, C, D, F, and INC. The body of the report shows a grade of IN. This is not catastrophic, but it is inexcusable.

• The verbal comments field is an interesting one:

○ The comments are not verbal; they are written.

○ It is apparent that the comments were not written, but were coded. Let's see, 1="Does well on tests," 2="Polite and cooperative," 3="Projects not completed" and so on. This adds a truly personal touch.

David L. Peterson, Southfield, Michigan

System Rated 'Poor'

• The subject abbreviations leave a good deal to be desired. Since an adequate number of print positions are available, it would not be amiss to print HEALTH 8 or SCIENCE, etc.

• "LEARN" is not a very good abbreviation for LEARNING.

violation for LEARNING.

• I am sorry to hear that your daughter has no auto (CARLESS). It's just like a computer not to be able to spell. Will they ever learn.

• "CHILDS" — look at that! The computer does not even know how to use an apostrophe. There probably is one on the print chain.

• If there are no previous credits, there should be a "0." Also, "Q.P.A." is not very clearly defined.

In general, it is not good to leave critical fields blank. The "quality point average" should be printed and a legend provided for interpretation. The data is available to calculate the "Q.P.A."

I would give this system a rating of poor. I know a better job can be done. My judgment is based on the fact that I am the director of a computer center that performs student grade reporting and scheduling for some 40,000 students yearly. Brother Austin David, FSC, Archdiocese of New York.

Report Gets 'INS'

Looks like you share one of my pet peeves, non user-related computer output.

• If Quinn R rates a first initial, why doesn't Crowley?

• Phrase "polite and cooperative" used too much.

• "Make-up work"?

As far as my grade for this is concerned, I'll rate it INS for incomprehensible. Gailand L. Kiltz, GTE Data Services, Inc., Tampa, Fla.

Verbal or Oral Comments

It is heart-warming to see that the form designer properly used the term "verbal comments" in this particular case. Of course, maybe he didn't really mean "verbal comments," but "oral comments." The word "verbal" is frequently misused for "oral." But "verbal" appears to be correct here, for once.

Your daughter seems to be doing very well in school — the systems people, not so well. Art Halliman, The Chesapeake and Ohio Railway Co., Cleveland, Ohio.

Who Designed Report?

The system as a whole should not be evaluated solely from the grade report since parental reporting is only one phase of a complete grading system. The value of computerized grading is to accommodate the need for consistent and controlled record keeping, which produces a complete and accurate set of statistical reports that are necessary for every school administrator.

I can only conclude the report was designed by an educator lacking a data processing oriented background. Wayne E. Manthey, Beloit Computer Center, Inc., Beloit, Wisconsin.

Send Back to Debug 101

• If PE (should be P.E.) is Physical Ed, I wonder if HE is heuristic ed or health.

• LIT and ENG are either two separate courses with the wrong course number, or should be combined as Eng. Lit.

• What happened to the grades in the first (semester?) for PE8 (or is it PE 8?) HE, ART and CHOR?

If this were the test result of an analyst and or programmer, I would send the analyst back to Systems 101 (poor horizontal form design and alignment) and the programmer to Debug 101 (careless programming and testing). It is a good example of extremely poor (unprofessional?) results to which many of us are constantly subjected. M.K. Garrison, Chamberlain Manufacturing Corp., Elmhurst, Ill.

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SCHOOL: WINCH PARK MIDDLE SCHOOL									
STUDENT: TAYLOR ALISON									
H.R.M.	I.D.NO.	Y.O.G.	PREVIOUS CREDITS	Q.P.A.	G.P.A.				
F221	04275	1976							
ATTENDANCE SUMMARY									
A	T	D	A	T	D	A	T	D	A
2	9	1							
						11	1		
COURSE NAME	CBS NO.	TEACHER NAME	1	2	3	4	5	6	7
PE8 GIRL	986-05BUCKLEY		C						
MATH	282-02CARDANI		A	A					
HE 8	686-04NYGAARD		IN						
ART 8	780-04QUINN R		C						
FR 8 TRI	487-02GEORGE		D	D					
SCI	383-02ZAMARRA		INA						
LIT	083-04CROWLEY		A	B					
ENG	083-04CROWLEY		A	B					
SOC ST	182-01ROSS		B	A					
CHOR 8	811-02REID		A						

GRADE LEGEND

THE FOLLOWING GRADES REPRESENT AN EVALUATION OF YOUR CHILD'S PERFORMANCE IN TERMS OF HIS OWN ABILITY.

A DOES CONSISTENTLY EXCELLENT WORK
B MAINTAINS HIGH PERFORMANCE LEVEL
C PERFORMS AT ACCEPTABLE LEVEL
D MEETS MINIMUM REQUIREMENTS
F DOES NOT MEET MIN REQUIREMENTS
INC INCOMPLETE

DOES WELL ON TESTS
POLITE AND COOPERATIVE

PROJECTS NOT COMPLETED
POLITE AND COOPERATIVE
CARLESS FOLLOWING DIRECTIONS

FAILS TO MAKE-UP WORK
NOT ALWAYS PREPARED FOR CLASS

GOOD ORAL WORK
POLITE AND COOPERATIVE
EXHIBITS GOOD EFFORT

EXCELLENT ATTITUDE TOWARD LEARN

POLITE AND COOPERATIVE
EXCELLENT ATTITUDE TOWARD LEARN

GOOD APPLICATION OF KNOWLEDGE
GOOD ATTITUDE
PARTICIPATES IN CLASS

GOOD APPLICATION OF KNOWLEDGE
EXHIBITS GOOD EFFORT

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Mid-Year Conference

Asis Meeting Focuses on Cost Reduction

DAYTON, Ohio — Cost Reduction in Information Systems is the theme of the First Mid-Year Regional Conference of the American Society for Information Science (Asis), which will be held here May 19-21.

The program of papers and discussion periods

Societies

will be divided into three areas, input cost reduction, cost reduction in systems, and general cost effectiveness and benefits. Papers range from specific subjects such as computer based photo-composition to general topics such as consumer research and capital investment, noted Frank Slater, technical program chairman.

'Devils Advocates'

Some "devils advocates" papers question the feasibility of reducing costs at the input end of the system, he noted.

Douglas S. Price, deputy director of the Eric

Processing and Reference Facility in Bethesda, Md., will conduct a mini tutorial on "building block analysis of real costs."

The mid-year regional conference is sponsored by seven midwest Asis chapters. Information is available through Robert McAfee Jr., Asis, 1140 Connecticut Ave., N.W. Washington, D.C., 20036.

Promotion of Software Development: Sig Topic

ATLANTIC CITY — A fact gathering session on how best to foster development of quality applied software will be held here Wednesday, May 17 under the auspices of the ACM Special Interest Group on University Computing Centers (SigUcc).

The meeting will also examine questions pertaining to the economics, management and proprietary considerations of distribution of government supported software.

Panel members for the meeting are: Dr. Ed Battiste, International Mathematics and Statistical Libraries, Inc., Lloyd Fosdick, University of Colorado, John Rice, Purdue University, Stuart Lynn, Rice University, James Hilsenrath, National Bureau of Standards and Dr. Gordon R. Sherman, Office of Computing Activities, National Science Foundation. The meeting will be held at the Dennis Hotel, from 5 to 8 p.m.

Japan Travel Grants Available From Afips

MONTVALE, N.J. — About 25 travel grants to attend the U.S.A./Japan Computer Conference in Tokyo in October will be awarded by the American Federation of Information Processing Societies (Afips), with funds provided by a grant from the National Science Foundation.

Applications must be submitted to Bruce Gilchrist, executive director of Afips, 210 Summit Ave., 07645, by June 1.

Each recipient will be required to prepare a meeting report which will subsequently be compiled into an overall report by Afips.

Codasyl Seminar Examines Cobol Compiler Building

PHILADELPHIA — A symposium on Cobol compiler building techniques will precede the annual meeting of the Conference on Data Systems Languages (Codasyl) here May 23.

Papers to be presented at Monday's symposium will cover topics such as "B2500, B3500, B4500 Cobol Compiler Design Techniques," by F. Alan Goodman of Burroughs Corp., and "Compiler Techniques in Block Structured Languages," by LeRoy R. Guck, also of Burroughs.

Joseph A. Franzo, Univac, will speak on "An approach to Reporting Compiler Detected Errors."

Fees for the meeting at the Activity Center, Drexel University, are \$15 for one day or \$25 for both days. For more information contact: W. Ronald Block, 1st Pennsylvania Bank, 3020 Market St., 6th Floor, 19104.

University Offers Tutorial On Interactive Graphics

STANFORD, Calif. — A week long tutorial on interactive computer graphics is being offered by Stanford University June 18-23 for those with programming knowledge.

The course will cover graphics hardware, software and selected applications and attendees will receive hands on experience and individual help, according to Professor David Thompson.

The \$495 fee includes room, board, tuition, materials and computer time. Enrollment deadline is May 15. For further information, contact Thompson at Industrial Engineering Department, Stanford University, 94305.

Another Westinghouse breakthrough: The COBOL Programmer's Tool Kit. At a commonsense price. Six timesaving aids. \$4800.

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Random Notes

'Cblshort' Cobol Processor For DOS/360 Costs \$300

LYONS, Ill. — Cblshort, a new Cobol precompiler for IBM 360 DOS users, requires 26K in addition to the supervisor. Some of the features of the \$300 program are: variable-length programmer abbreviations, standard abbreviations for high-volume reserved words, option of using disk or tape as a work drive when direct input to the compiler is requested, and automatic generation of all required job control.

Cblshort realigns all entries and nested IF statements for easier reading. It also can reformat existing programs and execute a program in one pass, according to the firm.

General Electronics can be reached through P.O. Box 79, 60534.

Automated Total Text Processing Available on Time-Sharing Net

ANN ARBOR, Mich. — A total text-processing system is the latest development of The Cyphernetics Corp. Called the Cyphertext Publication System, the new time-shared service provides text entry, storage, editing, sorting and indexing, formatting and phototypesetting capabilities.

Users of the service type their copy on a time-sharing terminal, with simple English instructions which specify type faces, line lengths, paragraph styles and other formatting information.

Cyphernetics can be reached through P.O. Box 2190, 48106.

Time Sharing Resources Develops Systems for Leasing Companies

GREAT NECK, N.Y. — Time Sharing Resources, Inc. has developed an integrated system of on-line and batch programs exclusively for leasing companies. Applications include: on-line message switching, orders and movements, rate/revenue projection analyses, budget planning and evaluation, billing/accounts receivable and financial modeling.

TSR is at 777 Northern Boulevard, 11022.

Many Minis Mimicked

BRAINTREE, Mass. — Users of DEC PDP-8s and -11s, Honeywell H-516s or Linolex L-45s can do program development through the Minicomputer Simulation capability, now available on the time-sharing network of Interactive Sciences Corp. (ISC).

This service allows users to write, assemble and debug programs before their minis have been delivered or to develop new systems without interrupting production tasks, once the minis are installed. ISC, with regional offices in New York City, Pittsburgh and Washington, D.C., is headquartered at 60 Brooks Drive, 02184.

By Don Leavitt

Of the CW Staff

ENCINO, Calif. — Plotting can be done six times faster on an IBM 1130-equipped with a spooling package from Technology Enterprises Inc. (TEI) than on the same CPU without the software.

Operations involving card or paper tape punching can also be controlled and im-

proved with the TEI package. Printer output, on the other hand, is not handled since it takes too much of the 1130's limited resources, the company said.

Output Shifted

Spooling shifts output for slow devices to disk where it awaits the availability of the device without delaying the program

generating the output. TEI's package lets the user operate in on-line or spooling mode, under program or external switch control.

Once spooled, the data is controlled by a utility program and plotted, or punched, concurrently with the execution of another application program. While this does, in effect, provide a form of multiprogramming on the 1130, TEI spokesmen stressed it is not a generalized MP facility.

The software includes modification of IBM's Disk Monitor System version 2 (DMS-2) which allows plotting or punching to be halted temporarily at the exit from a mainline program, and continued when execution of the next program begins.

Minimum Configuration

Minimum system configuration for the TEI spooler includes an 1130 CPU, Model 2B, with 8K words of memory, a 1442 card read/punch and an 1132 or 1403 printer or console printer. Additional 2310 disk storage drives are not essential, the company said, as the size of the file to store the plotter codes is specified by the user.

The package is available through a minimum six-month lease at \$375/mo or through purchase at \$3,750.

TEI is at 16055 Ventura Blvd., 91316.

Spooling Package Cuts 1130 Plot Times

Retrievals From Million Records Performed in Less Than 2 sec.

CAMBRIDGE, Mass. — Multikey retrievals from files of over a million records typically can be performed in under two seconds on an IBM 360/370 with the Model 204 on-line data base management system from Computer Corp. of America (CCA).

Like the earlier Model 104, the 204 supports variable-length and variable-format records. It provides shared file capability, on-line file maintenance and multiterminal operations, the company said.

Full Numerical Computation

This version adds, however, the capabilities of full numerical computation, on-line report generation and multithread processing of requests from remote terminals. These features give the system more flexibility and faster response times, a CCA spokesman noted.

Model 204 includes a user language which supports all the system facilities, and an access method package, through which Model 204 files can be used by programs written in conventional high-level languages such as Cobol. Thus this package is both "self-contained" and a "host language" data base manager, according to the Codasyl definitions.

The user language is in English so that non-DP operators can use it. Requests can be handled in "load-and-go" mode from terminals or card readers, or they may be stored as standard programs.

7070/7074 Simulated

MILWAUKEE, Wisc. — Users of IBM 7070 or 7074 programs who must choose between maintaining the old machines or acquiring an emulator for the 360 now have another alternative.

The Data Systems Division, A.O. Smith Co., has a 7070/7074 simulator package that operates under OS/360 as an application program. It requires no change to either the operating system or the original 7000 series programs, a Smith spokesman said.

The package requires a 140K byte OS region and can be purchased for \$24,500 or leased for \$1,000/mo.

Smith's Data Systems Division is at 8651 North Port Washington Road, 53217.

The access method is based on inverted file structures. Data can be retrieved directly from a file on the basis of multiple keys, without a sequential search of the file, and this makes retrievals "orders of magnitude faster" than otherwise possible, he added.

The system consists of 22 compatible modules which may be combined selectively to fit individual user needs. The basic system requires an OS/360 region of at least 77K bytes of core, which may be in main memory or a core extension. Data storage can be on 2311, 2314 or 3330 disks.

Rental of the basic system is \$300/mo. CCA is at 575 Technology Square, 02139.

Module Makes Numbers English

SOUTHFIELD, Mich. — A module that converts numbers into English equivalents, Checksaf from Computer Services Corp. can be used with Cobol, PL/I or Assembler programs under DOS or OS/360.

Developed primarily to make computer-prepared checks tamperproof, the conversion capability can avoid misunderstandings about data transmitted over telecommunication lines.

The module accepts either packed or character decimal fields and converts them into either of three formats. The simplest form states the data as a single amount, recognizing place values but no assumed decimal points. Thus, the field "3149" would be converted to "three-thousand-one-hundred-forty-nine."

If the user calls for the dollar value option, the amount would be spelled out as dollars and cents, with two decimal positions.

The third choice also assumes two decimal positions but prints the amount as a whole and a fraction expressed in hundredths.

The English values produced by the module can be right or left justified in the "target" area, under control of a user-specified parameter.

A one-byte numeric field is passed to the CALLING program by Checksaf to indicate the action taken by the module.

This field identifies the error condition in those cases when the conversion could not take place. This would be of particular value to the programmer during debugging, the company suggested.

The Checksaf module is in Assembler source code and can be cataloged into the appropriate subroutine CALL library so that it may be linked when referenced in a user program.

The module costs \$33 and can be ordered from 23225 Northwestern Highway, 48075.

Test Data Generator Added to Extract II

SAN FRANCISCO — Extract II, a retrieval, reformatting package from Meqa, has been enhanced to provide test data generation. The new feature allows fields to be generated from tables or ranges, the company said.

Self-check digit development, arithmetic capability and logical control over generation, using Boolean connectors, are included. In-line editing of generated results and recycling and selective regeneration of test files are also possible, Meqa noted.

Extract II requires 22K or 26K under DOS or OS, and is available in object form for \$500 from 26 O'Farrell St., 94108.

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TAPE LIBRARY PROBLEMS?

Computat Systems Corp. is offering all 360 users a complete tape library management package for only \$500. The CSC System provides for all edits and reports necessary to successfully manage the tape library. In addition, the system provides a generalized report writer capability. For further information contact:

F.A. Ryan
Computat Systems Corp.
200 Park Ave., Suite 303E, New York, N.Y. 10017
(212) 986-2515

Business Oriented

'Alice' Handles Time-Sharing on Novas

NEWPORT BEACH, Calif. — Data General Nova users with 8K of core, a multiplexer and disk can have a number of business-oriented features by using the Alpha Interactive Computing Environment (Alice) operating system from Educational Data Systems.

Alice is a multi-language, file oriented system that supports time-sharing operations.

The system includes an Extended Basic, a time-shared Assembler package, a computer-assisted instruction (CAI) author language, and a general purpose macroprocessor.

A range of system and utility functions provide user accounting reports, file security and debugging of programs while time-sharing is in use.

A file management system which can be used with most disks that function with the Nova minis provides random access to files, records and items. It also controls record format and length and the combining of data types within a record, company spokesmen said.

The Extended Basic includes extended precision fixed and floating point decimal arithmetic, PRINT USING instruction with Cobol-like format

controls for simplified report generation, string processing, and matrix operations.

The Assembler package provides a disk-to-disk editor, disk-to-disk assembler, and a machine language interpreter which combine to permit system software development under time-sharing.

The user accounting capabilities permit the setting of limits and the reporting of CPU time, connect time and file usage, by user-specified account numbers. The security system establishes four privilege levels and a need for passwords on any file. Files can have read-, write-, list-, copy- and run-protection, the company said.

Alice also includes a Fortran-to-Basic translator so that programs developed in the higher level language can be adapted to the level of the Basic user.

Alice is modular; the primary package includes the time-sharing operating system, Extended Basic and the data file support. It is available for a one time license fee of \$5,500. The complete system can be acquired for \$9,000. The firm is at 435 Windward Lane, 92660.



A complete mini computer system in an integrated, attractive package.

Why start from scratch every time you build a mini system? You're going to need an operator console, display and bulk storage in addition to the processor. The Datapoint 2200 has all these built right in along with the computer. And the computer will satisfy the most demanding programmer. Fourteen general purpose registers, push-down stack, interrupts, and up to 16K bytes of fast read-write memory give it plenty of power.

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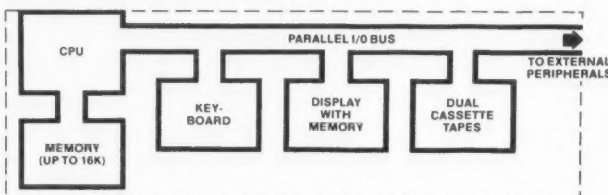
Software doesn't stop with essentials. The catalog has fixed and floating arithmetic routines, communications handlers, terminal simulators plus a high-level language system, DATABUS.

Expand the computing capability when you need it. Add memory, 30 c.p.s. and 135 l.p.m. printers, an 8 1/2"

industry-compatible tape and a cartridge disc. If you need to hook up with someone else, communications adaptors will get you on line from 37.5 to 9600 Baud asynchronous or synchronous. There's even a parallel data interface for interfacing to instrumentation or other data processing equipment.

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Hundreds of Datapoints 2200 systems are now installed worldwide. Sales and systems engineering available in all major cities with service nationwide.



Package Watches OS System, Staff Work

MCLEAN, Va. — IBM 360 users who are operating under both DOS and OS can monitor system utilization, measure programmer performance, and gain a good identification of operations productivity with the OS/DOS Performance Measurement and Accounting System from Johnson Systems.

The software handles data collected by the Systems Measurement Feature (SMF) of OS, and data from the Job Accounting module for DOS. It also accepts data about Time Sharing Option (TSO) operations and "foreign" operations including, for example, keypunch jobs, programmer changes, and library storage.

With this amount of input available, the user is able to design the reports he wants and the formats they are to follow. The system provides for the sorting of data, on up to three key fields, in either ascending or descending sequence.

The reports are structured through control card entries and as many as seven reports, each with independent design specifications, may be generated in one job step, Johnson claimed.

The cards for each report are cataloged to disk from which they can be retrieved with a single JCL card.

In addition to displaying Job Accounting statistics for DOS use, and SMF data elements for OS operations, the system can display more than 25 computed elements at the job and job step level. The reports may include control level breaks with totals identified by user-specified alphanumeric descriptive labels.

The price of the OS/DOS measurement system is \$2,450. A simpler DOS-only version is also available for \$1,450.

The firm is in the Grant Building, Westgate Research Park, 22101.

Ancom Eases Cobol

SAN DIEGO, Calif. — Ancom Systems has made available its Cobol Documentation System designed to ease the programmer's work during both program development and maintenance.

It expands short user-chosen data names into fully descriptive names, and replaces all existing procedure paragraph names with sequentially numbered ones, when used as a source code preprocessor.

The sequential numbering of paragraphs and the standardization of margins and indentations to indicate logical relationships within the program provide documentation better than most programmers are willing to prepare, Ancom suggested.

The package requires 48K of core and three tape or disk peripherals. It is priced at \$50/mo and can be ordered from 1250 Sixth Ave., 92101.

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Bits & Pieces

TM-34 Drives Are Low Price Subs for 3420s, 2420s

MARINA DEL REY, Calif. — The TM-34 tape drives and TC-38 controllers from Ampex are intended to provide a low-cost substitute for IBM 3420, 2420 and 2401 tape drives on systems 360 and 370.

The Ampex devices offer automatic threading and single capstan drives at prices up to 30% lower than IBM's, Ampex said. The Ampex drives feature speeds ranging from 75 to 125 in./sec and data transfer rates to 180k. Packing densities of 200, 556, 800 and 1,600 bit/sec are offered.

Prices for a system with two TC-345 drives and a TC-38 controller are \$1,360/mo on a two-year contract or \$68,000 purchased. This compares with a price of \$1,507/mo for two IBM 3420-V drives and a 3803 controller with a similar lease. First deliveries will be made this summer.

Memorex 3670 OK'd for 360/65

SANTA CLARA, Calif. — A major reason for large-scale 360 users to switch to 370s has been eliminated by Memorex Corp. The company's 2860 selector channel attachment allows the Memorex 3330-equivalent, the 3670, to be used with any 360/65 and above as well as with any 370.

Memorex also announced an enhancement to the 2860 controller attachment which allows up to four 360 and/or 370s to be used with a single 3330 system.

The 2860 costs \$250/mo. First deliveries are scheduled for the second quarter of 1973.

Smaller Bits

A regional computer service facility has been established in Dallas by Computer Hardware Consultants and Services, Inc. The plant will serve the Southwest in providing such services as customized system configurations, installation and removal of systems, warehousing, refurbishing and reconditioning, upgrading equipment with model and feature changes, and furnishing mixed systems staging, the company said.

The Model 276 Computer/Calculator Feedback Controller from Princeton Applied Research Corp. permits a calculator or computer to control an instrumented system. It costs \$1,950.

Cycle Tape Equipment Co., Los Gatos, Calif., has designed a system for handling punched paper tape with tape readers of either block or strip type at over 100 in./sec.

OCR-B One Step Closer for American Use

By Frank Piasta
Of the CW Staff

ZURICH, Switzerland — The problem of making printed matter equally acceptable to both man and machine may be a step closer to solution with the publication of the latest revision of the OCR-B font by the European Computer Manufacturers Association (Ecma).

Although it has been used in Europe since first recommended in 1969, the OCR-B font has found little favor in the U.S. where OCR-A is the accepted standard.

The latest OCR-B resulted from efforts by a joint task force from Ecma

1234567890
ABCDEFGHIJK
LMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
*+ -= / . , : ; " ' _
? ! () < > [] % # & @ ^

Part of Latest OCR-B Character Set and Ansi, and is known as Standard Ecma-11 second edition. Copies of the second edition of Stan-

dard Ecma-11 are free from the association. It also presents character shapes as large-scale drawings on a set of grids. Duplicates of the original drawings on a stable base of 100:1 scale with the 280mm by 380mm grid can be obtained.

The following sets of drawings are available: letterpress font, size I; letterpress font, size I, with the grid removed over approximately 2mm around the character outline (suitable for photocomposition); constant-strokewidth font, size I; and constant-strokewidth font, size III. Requests should be sent to the Secretary General, Ecma, at 114 Rue du Rhone, CH-1204.

IBM Adds OCR Unit for 370

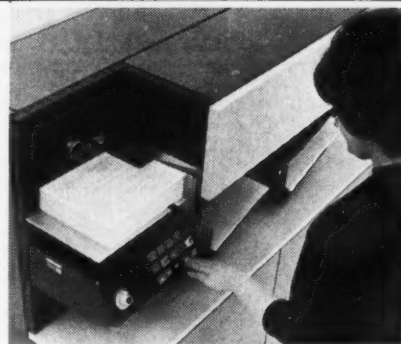
WHITE PLAINS, N.Y. — IBM has introduced an optical character reader that can read pencil marks either on-line into a System 370 system or off-line onto a magnetic tape.

The IBM 3881 can handle document sizes ranging from 3 in. by 3 in. to 9 in. by 12 in. All of the documents in one batch, however, must be of the same size, IBM said.

The reader is designed to operate with the System 370 models 135 or 145 as an on-line reader. It can also be configured to be used off-line with the data being written to an IBM 3410 magnetic tape unit for later processing.

The versatility of the device is enhanced by its ability to read up to six different formats of data within the same batch. This means that up to six different forms can be intermixed within one batch without presorting, provided they are all the same size.

An optional capability to read binary-coded decimal (BCD) data may add additional versatility to the 3881 and could allow reading of both preprinted BCD document identifiers as well as pencil-marked OCR information on a single pass through the machine. This could be especially useful in such applications as processing cards marked by utility meter readers, IBM pointed out.



IBM Mark Reader

Short-term lease rates on the 3881 begin at \$1,234 for the basic unit which will sell for \$51,000. First shipments will take place during the first quarter of 1973, IBM said.



(CW Photo by F.J. Piasta)
Data General's designer Max Scholz talks about his Novadisc.

Novadisc Claimed Crash Resistant

SOUTHBORO, Mass. — Data General has unveiled its first home-grown computer peripheral, the Novadisc disk drive, intended for the company's Nova family of minicomputers.

Announced shortly after a similar device was shown by Digital Equipment Corp., the Data General drive is said to provide significant design improvements at a lower cost than the DEC drive.

The Novadisc is a fixed-head drive in capacities of 128K, 256K, 512K and 768K 16-bit words. A standard 2311-type disk pack is used.

Air-Bearing

The unit features an unusual air-bearing that supports the head away from the disk surface. Exerting a force of 2 lbs and capable of tolerating a force of up to 4 lbs, the bearing design is said to prevent head crashes in even high-shock industrial applications.

Damage to the disk surface and heads is prevented with an automatic system that retracts the heads in case of power failure

or disk speed variation of over 10% from the normal 3,600 rpm.

The use of retractable heads in connection with the 2311-type packs may mean the drive could be used as a removable pack. The company would only admit the pack could be changed "in a couple of minutes," but maintained the unit was intended strictly as a fixed disk device.

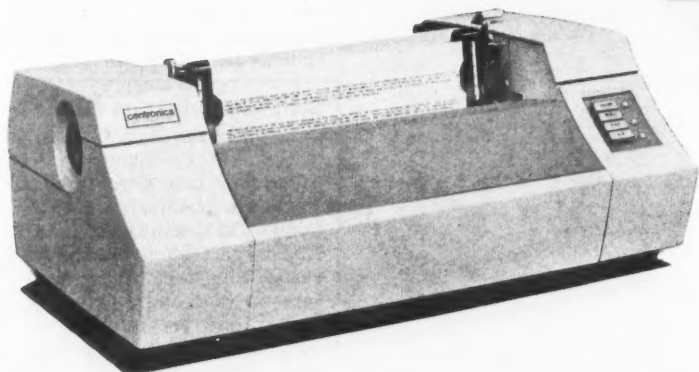
3-Frequency Recording

The Novadisc makes use of three-frequency recording which, Data General said, reduces the number of signal reversals required to enter data on the Novadisc. The new units have an average latency time of 8.4 msec and a data transfer rate of 2 million bit/sec.

The 256K Novadisc with control unit costs \$9,750. The prices of the other Novadisc sizes, including the \$3,000 controller, are: 128K, \$8,200; 512K, \$12,250, 768K, \$15,560. Units can be upgraded in the field by adding head assemblies, the company said.

First shipments are scheduled for July.

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DCC's Fastest 12-bit Minicomputer Offers Choice of Memory Technologies

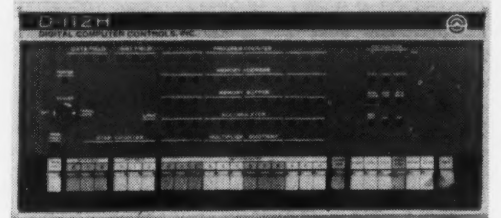
FAIRFIELD, N.J. — Claimed to be the most powerful 12-bit minicomputer available, the D-112H/SC from Digital Computer Controls, Inc. (DCC) can perform overlapped microinstructions using its semiconductor RAM (random access memory) in 200 nsec.

The D-112H/SC offers the user his choice of either semiconductor or a 1 μ sec core memory. In order to accommodate the variance in speed, the mini is equipped with special look-ahead circuits that adjust the internal timing to match that of the memory to be accessed in the next instruction.

The mini offers architectural compatibility with the DEC PDP-8, enhanced by faster speed, according to the firm. Other advantages cited for the D-112H/SC are an expanded instruction set and three times as many auto-index registers.

Core memory is available in 4K increments up to 32K words. The semiconductor memory is available in 256 word segments. Each 1K of semiconductor memory replaces 4K of core memory, limiting the total capacity of an all-semiconductor machine to 8K words.

An optional external micro I/O transfer provides



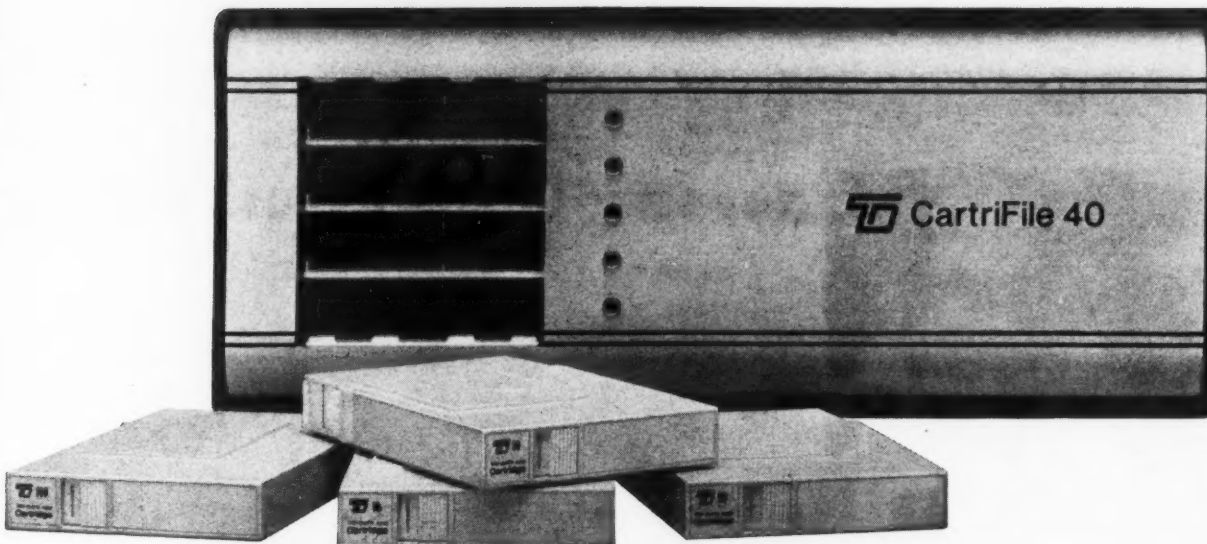
D-112H/SC Mini

program control IOP generator and all the interface signals for the I/O and data break transfers, and an optional I/O transfer data bus can be provided between the processor and any peripheral.

This bus is shared by memory and the peripheral, permitting transfer of data directly to or from memory.

The D-112H/SC with 4K of core memory, 1K of semiconductor RAM, and a TTY interface costs \$9,400. Delivery is 45 days from 12 Industrial Rd., Fairfield, N.J., 07006.

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Put these FOUR mag tape drives to work and you'll add real flexibility and power to your minicomputer system. Each drive in the CartriFile® 40 is independently controllable—and reads or writes up to 18,000 bits per second. You can use each drive by itself or in combination with the others.

CartriFile 40 comes complete with electronics (read, write, and controller) plus integral power supply. Also, interfacing, cables, and basic software for all popular minicomputers.

It operates with convenient, single-tape cartridges: new Tri-Data 1000 Series. These are available in 10-, 25-, 50-, and 150-foot lengths. With four 150-foot cartridges, the system can store nearly 13 million bits.

And the price? You'll like it. Only \$4950 with interface; \$3015 in small OEM quantities (without interface).

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Basic Input 80 OCR Meant for Small User

IRVING, Tex. — Recognition Equipment Inc. has announced a basic version of its Input 80 optical character recognition (OCR) system.

The system incorporates advanced optical reading technology in a lower-priced configuration designed for medium- and smaller-volume computer users, the company said.

Throughput and reading performance are similar to that of the standard Input 80 system.

System configuration includes a lower-cost programmed controller and peripheral subsystem. The data capture software provided offers the necessary editing functions and reduces user programming requirements, the company said.

In a single-font mode, the system leases for \$10,760/mo and sells for \$358,000. Basic multiple-font configuration has a monthly lease price of \$12,545 and sells for \$433,000. Basic multifont configuration leases for \$15,225 a month and sells for \$530,000. Delivery is eight months from Carpenter Freeway at Grauwylar Rd.

Sycor Adds Line Printer To Intelligent Terminal

ANN ARBOR, Mich. — A 200 line/min printer to be interfaced directly to its 340 Intelligent Terminal has been announced by Sycor Inc.

The 3485 printer is useful to remotely located Sycor intelligent terminal users who have high print volume applications, and who also require generation of documents for same day use, Sycor said.

The contents of two cassette tapes, 400K char., located on the 340 terminals, can be printed in less than 20 min on pin fed forms up to 18 in. wide.

The 3485 is a chain printer, and the belt-hammer printing system, stepping switches for paper advancement, and individual motors for ribbon drive are said to make the 3485 exceptionally reliable.

Yearly leases of the 3485 are available for \$395 per month including maintenance, and delivery is 60 days from 100 Phoenix Drive, 48014.

Standards Institute Offers Punched Paper Tape Guidelines

NEW YORK — Standards for punched paper tape have been published by the American National Standards Institute (Ansi). The standards, known as Ansi X3.34-1972, cover dimensions for interchange rolls, tape length, directional markers on tape and length of header and trailer, and are intended to guide in equipment design. Copies of the standards may be ordered for \$3 from Ansi at 1430 Broadway, 10018.

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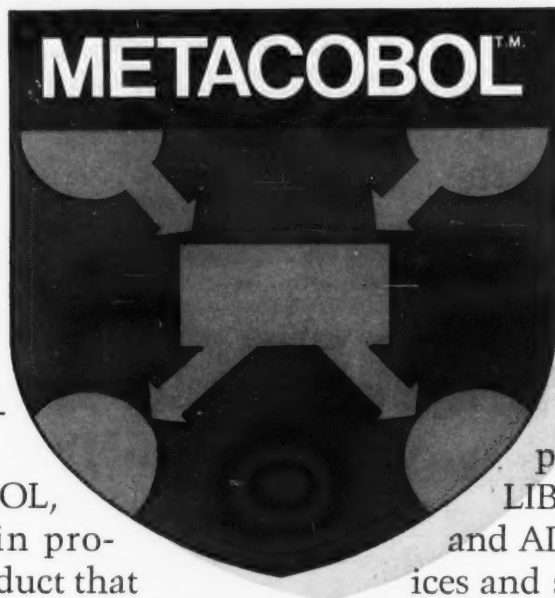
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programmers to develop and execute programs conversationally on-line to the computer, avoiding the interminable waiting of normal batch operations and the sagging morale that results from it.

MetaCOBOL and ROSCOE, along with other ADR software products—AUTOFLOW®, The LIBRARIAN®, SAM and PI SORT—and ADR's unmatched customer services and support can help you do more work in less time with more success.

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Route 206 Center, Princeton, N.J. 08540

Gentlemen: Yes, I'm interested in joining The Great Crusade for Increased Productivity. Please send me more information on: ☐ MetaCOBOL ☐ THE LIBRARIAN ☐ AUTOFLOW ☐ SAM ☐ ROSCOE ☐ PI SORT

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Data General, the world's number 2 minicomputer company, has just introduced a new line of compact, fixed-head discs — the Novadiscs.

They're the ruggedest, most reliable mini discs on the market.

When we designed the Novadiscs, we recognized that a critical consideration was reliability: most minicomputer discs simply can't stand up to the kind of hard use that minicomputer mainframes take.

So we made sure the Novadiscs have the guts to go anywhere our computers go — including the tough on-line industrial applications in which modern minicomputers work.

Instead of trying to fly the read-write heads on a fragile 30- or 40-gram air bearing, we designed an air bearing that can stand up to 4 pounds of force. So the heads aren't disturbed by the

A NEW DISC WITH GUTS.

bumps and jolts that make other discs crash.

When they're not flying, the heads are secured, outside the disc pack cylinder. So you don't risk a crash every time you move the unit across the room — or across the country.

The Novadisc recording medium is an industry-standard, 10-surface disc pack. The motor, drive spindle, drive belts, and air filters are the same ones used on big, mass-produced disc drives. Some of those parts are over-engineered for our requirements. They're also a lot less expensive and more reliable than anything else on the market.

The Novadiscs have all the other right specs, too.

Price. A Novadisc with storage capacity of 128K 16-bit words costs

\$5,200, 256K is \$6,750, 512K is \$9,250, and the 768K Novadisc costs \$12,560. Quantity discounts are available.

Size. Including power supply, the Novadiscs are only 12¼ inches high.

Speed. Average latency time is 8.4 milliseconds, and data transfer rate is 2 million bits per second.

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Software. Novadiscs are compatible with our device-independent Disc Operating System, which handles user I/O and provides interrupt-driven

buffered service for peripherals. DOS supports a relocatable assembler, editor, linking loader, Extended ALGOL, Extended FORTRAN, and Extended Timesharing BASIC.

Peripherals. You can add mag tape, other DOS-compatible discs, A/D and D/A, communications equipment, CRT's, plotters, printers, card readers, paper tape equipment.

In the past few years, over 2,500 Nova-line minicomputers and systems have been delivered.

We've made a reputation for making some pretty pushy claims — and for living up to them.

Now we're in the peripheral business. And just as pushy as ever.

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Data Briefs

Chicago Users Organize Teleprocessing Group

CHICAGO — A regional communications organization, the Teleprocessing Users Group (TUG), has been formed by 10 firms in the Chicago area.

The group recently held its first meeting and decided monthly meetings will deal primarily with networks; controllers and software; terminals; and modems and multiplexers/concentrators.

TUG will hold monthly workshop meetings covering one of the special interest areas, a spokesman said. The organization will be limited strictly to computer/communications users, with a membership of \$10/yr for each firm. Further information is available from Nick Petry, Spiegel Inc., 1040 West 35th St.

Sanders Has 2,400 bit/sec Modem

NASHUA, N.H. — Sanders Associates Inc. has introduced the Series 24D modem for operation at 2,400 bit/sec on "most unconditioned" leased lines and dial-up facilities.

The 24D is said to operate with digitally implemented phase-shift keyed modulation at either 1,200 or 2,400 bit/sec.

The modem is available on a 60-day delivery schedule for \$1,700. The firm is at Daniel Webster Highway South, 03060.

GE Modem Features Diagnostics

LYNCHBURG, Va. — GE has added a 2,400 bit/sec data set to its Dignet series. The 2201 is compatible with the Bell 201B and includes internal diagnostics and a switch-selectable line equalizer.

The 2201 has a test signal generator, error counter, local and remote loop-back capability. Using the built-in line equalizer, transmission over unconditioned Type 3002 lines or dial-up facilities with access arrangements is possible, GE said.

First deliveries of the 2201 are scheduled for June. The data set costs \$1,450 with rental plans available. GE Communications Systems Division can be reached through Box 4197, 24502.

Rixon Develops Fast Turnaround

SILVER SPRING, Md. — Rixon Electronics has announced the DS-1800C data modem for multipoint polling.

The unit features a turnaround time of 4 to 8 msec compared with a comparable Bell data set turnaround time of 60 msec, the company said.

The DS-1800C is compatible with the Bell 202 data set series and costs \$500. Rixon is at 2120 Industrial Parkway, 20904.

Couplers Called Arbitrary

Non-DAA Interconnection Predicted

By Ronald A. Frank
Of the CW Staff

NEW YORK — It is only a matter of time until data users are allowed "free interconnection" to the Bell System and the data access arrangements are declared unconstitutional, according to Sang Y. Whang, technical director of International Communications Corp.

The interconnection issue is similar to integration, Whang said, and he predicted that in five to 10 years users will be able to eliminate modems. The current DAA requirements are arbitrary, he said, and users should not allow this type of "forced busing regulation."

Speaking to about 100 data users at the spring regional seminar of the Communications Systems Management Association (CSMA), Whang said, "We can't lock up all users because of potential harm to the phone network."

Financial Analyst's Advice

When selecting independent communications equipment, the user should consult with a financial analyst to properly evaluate the effects of lease versus purchase options, according to Robert Kraynak of the Xerox communications staff.

While certain risks are included with the selection of non-carrier equipment, the user can protect himself with a strong contract, Kraynak said. Such an agreement should include minimum maintenance support to be provided by the independent supplier, and ideally it should include a provision to install alternate equipment when technically superior devices become available, he suggested.

Louis Feldner, FCC staff specialist on interconnection, described the efforts under way to develop new interconnection methods. The PBX study committee

has submitted several draft recommendations, none of which are final, Feldner said. After the technical and procedures subcommittees complete their recommendations on an interconnection method, the FCC will schedule formal hearings to be held before a joint board including both state and federal regulatory officials.

FCC Must Decide

Any findings or recommendations of this board will then be subject to final action by the FCC, the staff specialist said. Despite the many remaining procedural steps, Feldner said the interconnection study committees on PBXs and dialing/answering devices had worked "ferociously" to solve the complicated issues.

Three possible solutions to the interconnection of PBXs (and other equipment later) are certification, type acceptance and type approval, Feldner said. The approval method would give the FCC stronger control over interconnection equipment than the acceptance method, he said. A certification plan would involve an impartial organization to test non-carrier equipment, according to one observer.

Speaking for AT&T, Lawrence A. Hohmann, engineering manager for regulatory studies, said Bell's interconnection policies are designed to be "privately beneficial without being publicly harmful." It would not be sufficient for users to simply install approved non-carrier equipment, he said, since AT&T wants assurance that such equipment is properly installed and maintained by a common carrier.

Protection of phone facilities is not really a new concept, Hohmann said, and he repeated Bell's claim that protective

measures should also be added to private lines as well as the (already required) DAAs for dial-up lines.

Feldner told users the FCC is anxious to hear their views on pending regulatory issues. Since relatively few users have been included on the interconnection study groups, the commission staff does want to receive continuing inputs, Feld-

Line Problems Defined

NEW YORK — Phase jitter and T-carrier distortion are the two major types of line problems affecting AT&T's data users, according to Sang Y. Whang of International Communications Corp. (ICC).

High-speed modems must include technical features to overcome the technical line problems, Whang said. Many data users are operating at slower-than-desired speeds because of poor line quality, he said.

Phase jitter on data lines was first encountered when Bell began to replace tube-type equipment with solid-state devices, Whang said, and phase distortion originated with the advent of time-division multiplexing techniques.

Close cooperation between AT&T, ICC and others brought forth a test device to identify and measure phase jitter, Whang noted. Previously, Bell had no way to measure this characteristic, he said.

To solve the T-carrier distortion problem, AT&T is working with equipment vendors to define minimum non-acceptable levels, Whang acknowledged. One current problem is that AT&T says that 24dB distortion is tolerable, while independent experts say that this level is too high to be acceptable with high-speed data sets, he added.

Both problems are most harmful to data users instead of voice customers, according to Whang. And since the Bell System is designed primarily for voice, it may be difficult to find acceptable solutions, he said.

ADS Adds 1,200-3,600 bit/sec Modem, Multiplexer, Tester

CANOGA PARK, Calif. — American Data Systems has added a medium-speed modem, a time-division multiplexer and a data system simulator to its line of communications products.

The ADS-412/424/436 modem can operate at 1,200 bit/sec using frequency-shift keyed asynchronous transmissions or it can operate at 2,400 and 3,600 bit/sec with phase-shift synchronous data mode.

The modem operates at half- or full-duplex phone facilities, and is compatible with Bell 202 data sets, the company said. With an optional 2,400 bit/sec circuit module, the ADS modem is compatible with Bell 201 data sets and costs \$580.

The ADS-670 Data Distribution System can intermix seven baud rates in varied system configurations.

The multiplexer can handle up to 128 channels. A typical 16-channel system costs about \$6,090, a spokesman said.

The ADS-111 Data Systems Simulator can test a variety of data communications equipment. The unit generates a binary sequence of characters to check the operation of modems, multiplexers, interface terminals, automatic call devices and other equipment. The 111 can operate in four test modes and displays errors on the front panel.

The ADS-111 costs \$2,500. All three data devices are available in about 25 days from the company at 8851 Mason Ave., 91306.

ner said. He asked users to be specific when they call or write to the FCC staff. "We have heard all the big-picture phrases," Feldner said, adding that the commission is looking for detailed information.

Robert Liepold, president of United Business Communications, predicted that in-depth controversies "will arise when the established carriers selectively adjust their rates to compete with the new specialized carriers. But both the carriers and independent suppliers will have to be more receptive to the user's requirements, Liepold said.

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IBM Mobile Terminal Permits Police To Access Computer Files Directly

WHITE PLAINS, N.Y. — A mobile terminal from IBM will allow a policeman in a patrol car to access and update files stored in a 360 or 370 system.

The IBM 2976 mobile terminal allows the police officer to query the computer through a typewriter-like keyboard. The system can respond to the inquiry or can initiate messages which are relayed to the policeman either through eight signal lights or a strip printer.

Ten keys can be designated to

relay special messages from the squad car to headquarters.

A buffer memory is included in the terminal to allow data to be sent or received at faster than keying or printing rates. The printer produces a 21-char. line at 53 char./sec.

The system includes a transmission control unit that can poll each terminal at preset intervals. Heavy activity in a particular area can cause the control unit to automatically adjust its polling to minimize interference

among the busy terminals.

The system can operate with most 360s and all 370s equipped with multiplexer channels. A system for 300 squad cars will cost about \$1,270,000. First shipments are scheduled for the third quarter of 1973.



Policeman checks printout on IBM 2976 terminal.

Kit Lets 1004 Use Bisynch

DALLAS — University Computing Co. is offering users a logic conversion kit that permits a Univac 1004 to transmit data in the IBM 2780-compatible synchronous format.

The UCC 1204 conversion kit is housed in a low-profile cabinet and does not conflict with other 1004 operations, according to UCC.

The 1204 kit was developed primarily for 1004 users who have purchased the equipment and could benefit from the speed/format advantages of the 1004/2780 combination in remote terminal operations with

IBM 360 systems, UCC said.

Purchase price for the 1204 kit is \$12,800 with delivery to begin in August of 1972 from 1500 UCC Tower, 75222.

Terminal Optically Reads Cards, Checks Credit, Imprints Ticket

EL SEGUNDO, Calif. — A terminal that optically reads credit cards embossed with IMR-7B font, automatically verifies credit, and imprints the sales ticket has been developed by Data Source Corp.

The DSC 2101 was designed for use in gas stations and high volume retail outlets. As many as 47 terminals can be connected to a DSC 800 mini-based controller over a single 300 bit/sec leased line. The controller can

handle up to 64 lines and is hardware and software compatible with the IBM 360.

To verify credit the card is inserted in the terminal and the dollar amount of the transaction is entered. Within five to 10 seconds, a visual response from the credit center computer either authorizes the credit or indicates the action to be performed by the operator.

If credit had been authorized, the sales ticket is inserted and imprinted. In case of system failure, the imprinter can be operated manually.

The terminal is priced at under \$1,000 and will lease for \$25 to \$30/mo. First deliveries are scheduled for the third quarter, 1972.

The DSC 800 controller sells for about \$18,000 or \$600/mo; modems are priced at about \$10/mo. Software is included. Data Source Corp. is at 2350 Alaska Ave., 90245.



DSC 2101



A family of low-speed modems for the user or OEM. Here are seven models... many others to choose from.

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Model 301A—Acoustic coupler TTY and EIA interfaces. **\$245**

Model 301P—Acoustic coupler kit for Series 33 Teletype installation **\$245**

Model 302D—replacement for 103A. Automatic answering with 1001B, CBS DAA. TTY motor starter, initiate & respond to long space disconnect and 10 minute activity disconnect **\$325**

Model 302F—replacement for 103F. Private line and 1000A, CDT DAA applications. **\$245**

Model 310—PC modem for OEM. Originate, acoustic/DAA, carrier detect, 4 1/2 x 5 1/2 x 1 1/2". **\$125**

Model 320—PC modem for OEM. Answer/originate, acoustic/DAA, carrier detect, integral power supply. 4 1/2 x 10 1/2 x 3 3/4". **\$165**

Series 330—Replacement for 103A, 103F, 103E, 113A and 113B. Automatic answering with CBS or CBT DAA. 16 modems in a 19" rack. Colored display panel indicates 4 controls and 2 data functions.

Auto answer modem **\$195**

Private line modem **\$175**

Complete cabinet, display and 16 Modems **\$3,825**
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5440 — Private Label:	\$115 ea. 1 yr. Warranty
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SJCC Makes 'Every Effort' for User Needs

By Edward J. Bride
Of the CW Staff

ATLANTIC CITY, N.J. — Innovations in the technical program, registration format and in business matters with exhibitors mark the attempts of the Joint Computer Conference committee to keep the JCCs respon-

Pages 21-32 are devoted to advance coverage of the products and services on display at next week's Spring Joint Computer Conference.

sive to user and industry needs.

At next week's spring conference here, for example, "every effort is being made" to make the exhibit program "as accessible as possible" to DP specialists and users, stated Keith Uncapher, Afips president.

A new one-day exhibit-only registration is available at \$5, he said; there is also a one-day fee for both the technical program and the exhibits, for \$15.

These new registration fees have been initiated in order to attract conference-goers to Atlantic City for the last time; next year the spring conference moves to Philadelphia. The Fall Joint Computer Conference has already cancelled its Las Vegas date, in favor of an early December meeting in Anaheim, Calif.

While there will be few prod-

ucts introduced to end users, about a third of the exhibiting companies will be displaying recently-announced peripherals and accessories for the first time.

The emphasis in the exhibit hall appears to be on communications and terminal equipment, and most of that for the OEM market.

While the various JCC committees have attempted to reorient the technical program for the end user, the chairmen of the technical sessions are almost entirely university or industry types, which continues tradition over the last several years.

There are 37 sessions, plus several new ideas that formulate the technical program. One-third of these sessions is devoted to programming and software, with the others covering general and scientific applications, hardware, education and theory, administrative issues, and the two special evening panel sessions.

The Wednesday evening sessions, both at 8, deal with program documentation (a workshop), and the role and scope of computer systems design research in a university setting.

A late addition to the technical program is a user workshop on "Contracting for Computer Use."

The workshop is open to all SJCC attendees, including those who choose to register for one-day exhibits-only.

The workshop will take the form of a clinic, and will be conducted by Roy N. Freed, a Boston attorney who specializes in contracting for computer use.

The session "will provide first-hand answers and practical advice" to anyone concerned with the acquisition of computers or EDP services, Afips said. "It has been structured to be of immediate assistance to users and to EDP producers and suppliers," an official said.

The keynote address at 9 Tuesday morning will be given by T. Vincent Learson, chairman of the board and chief executive officer of IBM.

Advanced registrations were being received at the rate of about 100 a day, and the period

was extended until late last week, Afips said. It was expected that about 2,000 advance registrants would be recorded, which would not represent a drastic change from normal.

Societies Rival Technical Program

ATLANTIC CITY — While the technical program at this year's SJCC is one of the most comprehensive ever, the same can also be said of the senior DP societies, the Association for Computer Machinery and the Institute of Electrical and Electronics Engineers Computer Society. Both of these groups will be holding meetings, some open to the public, regarding progress in technical subjects. They will also hold special board meetings, which are not listed here.

All meetings of the ACM will be held in the Dennis Hotel; the IEEE Computer Society will hold its meetings at the Holiday Inn.

Association for Computing Machinery

Monday, May 15

1 — 5 p.m. Curriculum Committee on Computer Science.

8 — 10 p.m. Computer Resource Accounting (sponsored by Special Interest Group (SIG) for Computer Systems Installation Management).

Tuesday, May 16

1:30 — 3:45 p.m. Curriculum Recommendations for Graduate Professional Programs in Information Systems (sponsored by Curriculum Committee on Computer Education for Management).

2 — 5 p.m. ACM Standards Committee; Professional Standards and Practices Committee.

5 — 6 p.m. External Activities Board.

7:30 — 10:30 p.m. Panel meeting on a program to develop a computer that "understands" speech (sponsored by SIG Artificial Intelligence).

8 — 10 p.m. Open business meeting to discuss future directions of SIG/Computer Science Education.

8 — 10 p.m. Informal meeting of active users of computers in teaching; emphasis on work in progress (sponsored by SIG/Computer Usage in Education).

8:30 — 10:30 p.m. Software Considerations in the Design of Data Communication Systems. Business/technical meeting of SIG/Communications. Plans will also be outlined for 1972 International Conference on Computer Communications.

Wednesday, May 17

7:30 — 9 a.m. Audit Controls for On-Line Processing (business/technical meeting sponsored by SIG/Business Data Processing).

8:30 — 10 a.m. Breakfast/business meeting (open), sponsored by SIG/Simulation.

5 — 8 p.m. Panel meeting on improving the quality of software for researchers, sponsored by SIG/University Computing Centers.

6 — 7:30 p.m. Meeting of SIG/File Description and Translation.

6 — 8 p.m. Computer Graphics in Design Auto-

mation, joint technical meeting sponsored by two SIGs, Graphics and Design Automation.

6 — 9 p.m. Data Structures in Information Retrieval, sponsored by SIG/Information Retrieval.

7 — 9 p.m. Business/technical meeting on Surviving as Social Science Computing Specialists in the Job Market (sponsored by SIG/Social Science Computing).

7 — 9 p.m. Forum on the Environment, sponsored by the subcommittee on the environment, SIG/Computers and Society.

8 — 11 p.m. Computers and the Physically Handicapped.

8 — 11 p.m. Background and Technical aspects of PL/1 Standardization, sponsored by SIG/Programming Languages.

8 — 11 p.m. SIG/Numerical Analysis.

Thursday, May 18

9 a.m. — 12 p.m. Professional Standards Committee.

Friday, May 19

9 a.m. — 5 p.m. ACM Council.

9 a.m. — 5 p.m. Joint meeting, SIG/Physically Handicapped and Visually Impaired Data Processors International.

IEEE Computer Society

Tuesday, May 16

1 — 4 p.m. Operating Systems.

7 — 12 p.m. Data Access and Control.

Wednesday, May 17

8 a.m. — 1 p.m. Peripheral Equipment.

9 a.m. — 1 p.m. Computer Elements.

9:30 a.m. — 12:30 p.m. Computer Communications.

1 — 5 p.m. Education.

1 — 5 p.m. Pattern Recognition.

3:30 — 6 p.m. Communications Standards Subcommittee.

Thursday, May 18

10 a.m. — 3 p.m. New Activities.

12 — 6 p.m. Socio-Economics.

Friday, May 19

9 a.m. — 5 p.m. Governing Board.

SJCC Fee Structure

With advanced registration complete, the following fees are applicable for the SJCC:

Total conference for members of Afips societies, **\$30

Total conference, non-members, **\$45

Students; military in uniform, \$5

One-day, including sessions, \$15

One day, exhibits only, \$5

Three days, exhibits only, \$10

Luncheon, \$8

Conference reception, \$9

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Inforex 1302 Triples 1301 Disk Capacity

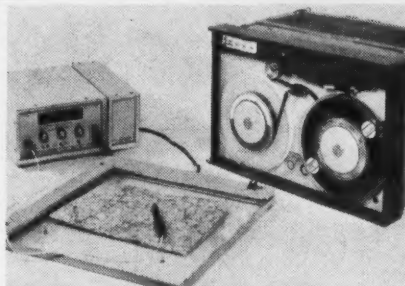
ATLANTIC CITY — Inforex will show its System 1302, a more powerful version of the 1301 key-to-disk data-entry system introduced by the company over two years ago.

Inforex will also exhibit in SJCC booth 1310 reformatting and the interval timer features for the first time as well as the company's recently announced on-line communications capability.

The 1302 system offers more than three times the disk capacity of the 1301 and supports from one to 16 keystations. Rental cost of the 1302 is as low as \$101/keystation/mo, with maintenance.

The on-line communications feature permits users of Inforex data entry systems to send and receive taped data directly to and from IBM computers via IBM 2701 or 2703 Data Transmission Control Units or via the Bisync Adapter for users of the IBM Model 360/20.

Cost of the on-line communications feature is \$100/mo/system, including maintenance, or \$2,800 for outright purchase.



Graf/Pen, Tape System

SAC Has Graf/Pen, Tape Systems

ATLANTIC CITY — The Science Accessories Corp. exhibit at booth 432 will feature two new off-line systems for the conversion and storage of digital information from graphic displays.

Both systems are based on the use of SAC's Graf/Pen sonic digitizer to generate digital coordinates from graphic representations.

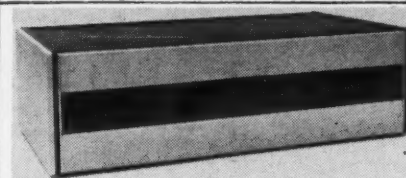
Systems 2021 and 2022 utilize magnetic tape as the storage medium. System 2021 uses 7-track tape; System 2022, 9-track.

Paradyne to Show Four Modems

ATLANTIC CITY — Paradyne Corp. will feature continuous on-line demonstrations of one of its high-speed, dial-up data communications systems — the Paradyne Bisync-48 at booth 2214. The modem will be connected to a 2780-type terminal.

Three additional modems/error-control systems will be exhibited. The M-48 is a

4,800 bit/sec modem that offers optimum performance on 4-wire unconditioned leased or dial-up lines. The Pix-600 is a 600 byte/sec parallel interface extender which incorporates a 4,800 bit/sec modem, an error-control system and an I/O channel interface. The Marq-48 is an error-control modem which provides a 4,800 bit/sec error-free throughput on most dial-up or unconditioned private lines.



Model Modem

Sangamo will be displaying new second-generation data sets at booth 2322, including the TA201B (above), operating at 2,400 bit/sec via either unconditioned lines of the DDD network and the T4800 operating at 4,800 bit/sec via the DDD network.

Series 30 Teleprinter Prints at 30 char./sec

ATLANTIC CITY — The Series 30 Teleprinter, a serial impact page teleprinter designed to operate asynchronously at 30 char./sec, will be demonstrated at booth 1709 by International Teleprinter Corp.

An original and five carbons can be produced with clarity and sharpness.

Series 30 Teleprinters operate half or full duplex and use friction or sprocket-feed, roll or fanfold paper. Optional features include the following interfaces: parallel TTL; Serial TTL; Serial Current Loop; and Serial EIA RS 232-C.

OEM prices are: RO Teleprinter \$1,100; KSR, \$1,400; ASR Teleprinter, \$2,000. All are complete with console containing necessary electronics. Quantity shipments will begin in July for RO and KSR Teleprinters and in November for ASR Teleprinters.

PGI Disk System Uses Universal Controller

ATLANTIC CITY — Peripherals General, Inc. will exhibit its model 844 Disk Storage System for the first time at booth 408.

The disk system, which uses PGI's Universal Controller, is intended as a replacement for the IBM 2314 at lower cost. The controller can be programmed to adapt to any manufacturer's computer system, the company said.

Unicomp Display Includes Full Signal Analysis Unit

ATLANTIC CITY — Unicomp, Inc. will display a complete signal analysis system, including a minicomputer, and featuring the Model 030FFT processor. The system includes analog-to-digital input, oscilloscope display and utilizes Unicomp's own array-processing language. Real-time analysis of voice prints, noise and signals mixed in noise will be performed. Unicomp is at booth 214.

Mark Reader Uses Block Print

ATLANTIC CITY — Optical Scanning Corp. is exhibiting the OpScan 17, a low-cost optical mark reader used in the conversion of source document information to computer-usable information. The unit can be used as a local off-line device, i.e., to a keypunch, or as a terminal. It incorporates the block print feature which allows it to perform functions of many OCR readers, the company said. Optical Scanning Corp. is at booth 429.

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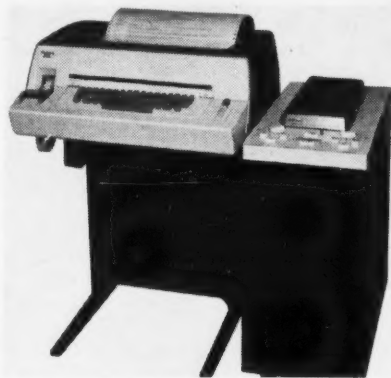
Feature Allows Auto-Answering

SKOKIE, Ill. — Teletype Corp. will show its Model 38 wide-platen ASR terminal associated with the 4210 magnetic tape data terminal at booth 2108.

This remote computing terminal arrangement, Teletype said, allows for a wide variety of economy and versatility in the field of remote batch computing. It includes a Teletype 38 with a 15-in. platen which can print 132 char./line. The 4210 terminal can handle data distribution and collection at speeds to 2,400 word/min.

With the automatic rewind feature on

the 4210, the user can place the unit in an unattended answer mode and receive data at high speed during low line-rate hours, the company said. Once the data has been received, the 4210 will automatically rewind the tape and print the data at 100 word/min.



Model 38 Terminal and 4210 Mag Tape Terminal

Four Displays Share 4610 Hard-Copy Unit

ATLANTIC CITY — Scheduled to make its first appearance at an SJCC is the Tektronix 613 Storage Display Monitor, a data storage and display instrument.

Also slated to be shown at booth 720 are the 4610 Hard-Copy Unit and the 4010 Computer Display Terminal. The company will demonstrate the ability of the 4610 to be used with from one to four displays.

The 4911 Paper Tape Reader Perforator and the 4912 Digital Cassette Tape Unit are attached to the 4010 terminal.



Tektronix 4010 Terminal and 4610 Hard-Copy Unit

Fast Terminal Ready

ATLANTIC CITY — Execuport 1200, an asynchronous serial impact printing terminal with a speed of 120 char./sec will be shown in booth 301 by Computer Transceiver Systems Inc. (CTSI).

Execuport 1200 is compatible with low- and medium-speed teletypewriters. It can print either a full 132-column line from a buffer or one character at a time.

In addition to the 120 char./sec setting, the 1200 may be operated at speeds of 10, 15, 30 or 60 char./sec.

The basic Execuport 1200 KSR costs \$4,500. Delivery is 90 days.



Execuport 1200 terminal has speed of 120 char./sec.

Demonstrations Scheduled For Plug-In Memory Units

ATLANTIC CITY — Data Recall Large Core Storage Memories for the IBM 360/50 and 360/65 and mainframe memory systems for the IBM 370/155 and 370/165 will be demonstrated by the Computer Investors Group, Inc., in booth 8.

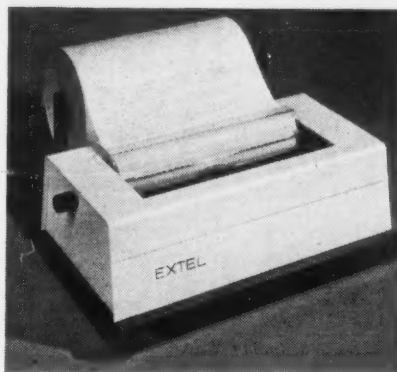
The LCS units have capacities up to 8M bytes. Access time on the LCS 50 is 2.5 μ sec, while the LCS 65 has a cycle time of 1.8 μ sec, CIG said.

Digitronics to Show Variety of Devices For Use With Minis

ATLANTIC CITY — Digitronics will display its largest series of peripheral input/output products at booth 2208.

The exhibit will include a demonstration of the 1600 Series IBM-compatible magnetic tape transports, operating through a Digitronics Model 1608E Controller to a DEC computer.

Another unit now available is the Model MCT-7, a miniature cartridge transport. The Model 2560 Perforated Tape Reader, the latest addition to the Digitronics perforated tape line of equipment, will be unveiled at the exhibit. It operates asynchronously or synchronously at speeds to 400 char./sec, reads all commercially available tapes and requires only 3-1/2 in. of panel rack space. The Digitronics Model 100 Big Little Line Printer, compatible with many minicomputers and data terminals, claims the print quality of high-speed printers in a unit a little larger than an electric typewriter.



Extel Printer

Extel Corp. will show its small lightweight printer, compatible with established teleprinter codes and capable of speeds to 15 char./sec, at booth 1705. The Series AC printers employ a 50 char./line format on 6-in. paper while the Series AD offers 74 char./line printing on 8-1/2 in. paper. Printing is performed with a 5 by 7 dot matrix directly on pressure-sensitive paper, without the use of ink or ribbons. Three copies can be made.

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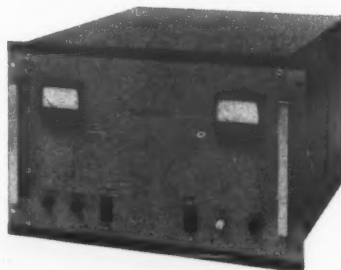
When the AC power does go off, the Elgar UPS continues to supply AC power from its internal reserve with *no* interruption. Your equipment won't know anything ever happened.

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And the prices start at only \$1500.

If you'd like to hear how it'll back up your operation call Wally Foy collect, (714) 279-0800, 8159 Engineer Road, San Diego, California 92111. After all, swearing at the power company is silly, and playing with matches in the dark can be dangerous.



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Honeywell launches a new attack on communications and control problems: System 700.



The new Honeywell System 700 can turn your computer into a complete information network. Even if your computer isn't a Honeywell computer.

The new Honeywell System 700 is more than a minicomputer, it's a minicomputer system that can be combined into networks capable of carrying on intelligent two-way conversations with hundreds of

data control points—wherever those points may be—on your production line, in scattered departments, or in distant plants.

The new Honeywell System 700 combines hardware and software to become a communications processor, remote line concentrator, terminal controller, sensor multiplexor, store and forward system, peripheral con-

trol system—whatever you need.

Thanks to compatible software, our System 700 builds on the continuing success of our Series 16 minicomputers. And, thanks to the communications and control experience we've gained installing thousands of minicomputer systems, we'll keep your data coming and going, and your System 700 buzzing productively.

The Other Computer Company: **Honeywell**



ICC to Show Full Line of Modems

ATLANTIC CITY — International Communications Corp. will exhibit its line of high-speed modems in booth 1414. ICC will feature Modem 4600/48, a 4,800 bit/sec data set with total operation, equalization and circuit testing from one end of the line. Modem 4600/48 is the next generation beyond the ICC Modem 4400/48, presently in wider use worldwide than any other 4,800 bit/sec modem, ICC said.

The ICC exhibit will also feature Modem 4800/72, an adaptively equal-

ized full-duplex data set designed for optimum performance at 7,200 bit/sec over C-1 conditioned lines and dial back-up at 4,800 bit/sec.

An optional feature is available with the 4800/72 to enable simultaneous transfer of several 2,400 bit/sec data streams. The data set can provide three full-duplex 2,400 bit/sec transmissions over one C-1 conditioned line.

Techtran Communications Terminal Plug Compatible

ATLANTIC CITY — Techtran Industries, Inc. will show the 4100 Communications Terminal at booth 1220.

The 4100 is plug-compatible with most data terminals and minicomputers. Featured are switch-selectable speeds from 110 to 2,400 bit/sec, high-speed search, full remote control, data edit, auto answer and switch-selectable on-line/off-line operation. The 4100 is available in an IBM-coded model for applications with 2741 terminals.



ICC Modem 4600/48



The Collector

Numeridex Tape Systems, Inc., a Chicago firm, will show its Model No. 760 Data Center for the simultaneous feeding and collecting of punched paper tapes for Teletype Model 32, Model 33, Model 35 and other terminals. The display is in booth 1701.

Graphic Terminal And Scan Converter Comprise PEP Show

ATLANTIC CITY — Princeton Electronic Products, Inc. will display the Princeton 801 graphic computer terminal and its high resolution PEP-402 image storage and scan conversion terminal in booth 1610.

The Princeton 801, a stored image terminal using PEP's Lithocon silicon storage tube, features high-density display of alphanumeric and graphics and selective erase of any picture element. A full range of options is available.

The PEP-402 image storage and scan conversion terminal will also be shown for the first time, featuring 3,000 line limiting resolution per diameter. Ten logarithmic shades of gray can be displayed.

Multigraphics Has Office Copy Devices

ATLANTIC CITY — Multigraphics Division of Addressograph Multigraph Corp. will exhibit its copy devices in booth 302.

The Continuous Total Copy System will demonstrate the quantity reproduction of computer printout. This system combines an AM 2300 electrostatic copier with reduction capability and a Multilith Offset 2850 duplicator to produce 150 copy/min on ordinary paper.

Also being shown is the AM 5000 office copier that can produce up to 50 dry copy/min on bond-like paper. It is claimed by the firm as the fastest short-run machine on the market, and is designed for offices reproducing 10,000 to 50,000 business documents a month.

Display for Editing

ATLANTIC CITY — Sugarman Labs will demonstrate an intelligent CRT terminal interfaced to a cassette recorder, a hard-copy printer and an upper/lower case typewriter. The demonstration at booth 1012 will be of interest to on-line and off-line computer text-editing users, Sugarman said.

The terminal features full duplex to 9,600 bit/sec, cursor address and inquiry, page flip with scroll, asynchronous and synchronous polling, communications discipline and vector and curve graphics.

Codex Modem Designed For Multipoint Polled Uses

ATLANTIC CITY — Codex Corp. will show its automatic equalizing 4,800 bit/sec modem, the Codex 4800 Multipoint Modem (Codex 4800-MP), designed specifically for multipoint polled applications.

The auto-equalization time is 50 msec, which approaches the synchronization setup time of manually equalized modems while eliminating the need for manual adjustments, the company said. Pricing of Codex 4800 modems begins at \$5,575.

Codex is also showing its 880 Time Division Multiplexer and its 9600 Data Modem at booth 516.

Container Holds 10,000 lb

ATLANTIC CITY — A typical "soft touch" container, designed to provide maximum protection to electronic instruments, computers and machinery during shipment, and its loading apparatus will be displayed by United Air Lines (UAL) at booth 17.

A modified standard jet freighter container, the "soft touch" unit features an internal tie-down process.

It has a capacity of 10,000 lb and a volume of 457 cu ft.

The "soft touch" system is designed to appeal mainly to the manufacturer or lessor of electronic computer equipment, especially where shipments are less than truckload in size and 1,500 miles or more in distance, UAL said.

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COMPATIBILITY!

EDOS is 100% compatible with DOS. All IBM distributed programs and all user written programs will operate under EDOS without modification. No modification to the programs, job control language, or data files is required. Programs do not need to be recompiled. Problem programs can be run under the control of EDOS and then be immediately run under DOS control, if you desire. EDOS benefits are universal, from the 32K DOS system to the larger users who may be considering a DOS to OS conversion. EDOS is extremely easy to install since no changes are required to your current operation.

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The basic System Release 4 of EDOS (all features except six partition support) has a lease price of \$225.00 per month.

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Mag Tape Cassette System for Minis

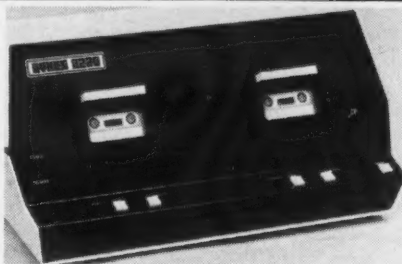
ATLANTIC CITY — Sykes Datatronics, Inc. is showing its Compu/Corder 120 system for the first time at booth 221.

The Model 120, an improved version of the Compu/Corder 100 system, features read/write speeds of up to 12 in./sec at 1,000 bit/in. The 120 also features greatly reduced interrecord gaps permitting the unit to be used efficiently in applications where short records must be written on tape. The interrecord gap is .10 in. in the 5 in./sec version and .45 in. at 12 in./sec compared with an interrecord gap of nearly an inch with the Compu/Corder 100, the company said.

The higher transfer rate and shorter interrecord gap make the Compu/Corder 120 system suitable for minicomputer-based small business systems.

The Series 2000 Cassette Tape Controller with EIA (RS 232C) interface will also be shown.

The Series 2000 with EIA interface has unattended remote operation, a monitor function which permits simultaneous dis-



Sykes 2220 Cassette Tape Controller
play of information transmitted or received and permits on-line or off-line operation.

Keyboards, Switches, Motors...

ATLANTIC CITY — Conference attendees will see the first East Coast display of several Micro Switch solid-state keyboards, modular key and panel mount solid-state pushbuttons and high-performance dc motors with new digital encoders. General-purpose solid state switches, two new lines of pushbuttons and commercial grade toggles and several versions of the "rolling wave" SV switch will also be shown at booths 2223 and 2225.

The 75SW12 is a solid-state keyboard

with a touch-typing key arrangement that conforms to the U.S. standard for typewriter pairings.

The solid-state modular pushbuttons are the unlighted 101SN and the lighted 201SN.

In addition to the new optical-encoded (digital) high-performance dc motors, Micro Switch will demonstrate lines of analog-controlled motors that can operate from the 75 in./sec tape-drive range of 200 in./sec, most of them available with air cooling.

On display will be two versions of Micro Switch's thin profile "rolling wave" miniature basic switch.

Three versions of the general-purpose SS solid-state switches will also be displayed, including the new 15SS with current sinking output and a wider temperature range of operation (-67° to +257° F.).

Micro Switch will exhibit its line of low-cost (under \$2 in quantity orders) lighted pushbuttons, the Series 4.

The Series 8 line of miniature toggles has high-quality performance in manually operated commercial grade switches.

Plotter Interface Cuts Commands

ATLANTIC CITY — Houston Instrument has a plotter interface for positive bus PDP-8 Series computers. This plotter interface relieves the software of computing the best incremental straight line between two points and reduces the number of I/O commands to the plotter interface.

This interface is intended only for operational environments where computer

time for driving a plotter is at a premium, and should not be utilized instead of the standard DEC plotter interface when computational time is not critical, the company said.

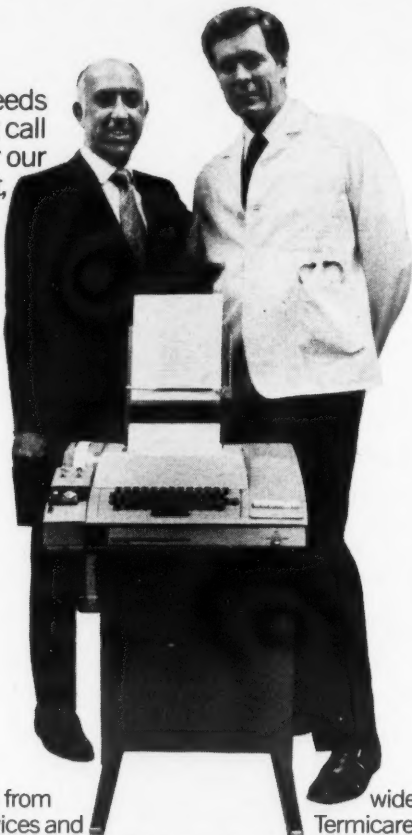
The plotter interface may be used with any plotter having DTL/TTL-compatible inputs. Delivery is 60 days.

Houston Instrument Division of Bausch & Lomb will be at booth 522.

Introducing Termicare,TM our nationwide health plan for data terminals.

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Z.V. Zakarian, president
Western Union
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We work with you to define your communications needs and offer cost-effective solutions. And we provide support and service anywhere.

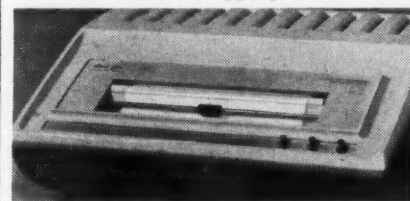
Remember to call 800-631-7000 for Termicare service (in N.J. 800-562-6976). For information on terminals or systems call 800-631-7050 (in N.J. 201-529-1170). Or write Western Union Data Services Company, 16 McKee Drive, Mahwah, N.J. 07430.

*Registered trademark of AT&T.

Terminals Suited For Hard-Copy Use

ATLANTIC CITY — Three new models of the "Silent 700" Electronic Data Terminals featuring a compact enclosure will be demonstrated by Texas Instruments at booth 2308.

Suited for hard-copy printer applications, the terminals can provide hard copy for hospital printout monitors, news wire services and video-terminal display systems. The Model 722S, with bit parallel data interface, is appropriate for com-



Silent 700 Electronic Data Terminal

puter applications supplying TTL logic levels. The Model 721S, with serial data set interface, and the Model 731S, with serial dc signal interface, are compatible with systems requiring EIA, modem or TTY interfacing.

Unit prices for the new models are \$2,490 for the 721S, \$2,175 for the 722S and \$2,415 for the 731S with deliveries in 30 days. Options include upper- and lower-case alphabet, a built-in copy lighting kit and, for the 721S only, a built-in data set.

Librascope Plans Full Line Of L107 Disk Memories

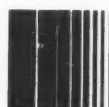
ATLANTIC CITY — The Librascope Division of The Singer Company will exhibit its complete line of L107 disk memories at booth 3.

The latest model in the L107 Series, the L107B, provides up to 18 million bits of storage on 256 tracks. The unit is configured to a 14.7-in. by 9-in. dimensional size.

Models L107A and the militarized L107MA will also be displayed. These models offer up to 7 million bits storage capacity, originating from a 9-in. by 7-in. package design.

All L107 models feature TTL, NRZ interface and are available with either 8.5 or 17 msec average access times with a 2MHz bit rate.

Flying head-per-track design contributes to high reliability, according to the company. Ruggedized for industrial applications, all L107 disk memories can operate at 10G shock and 2G vibration without special mounting. In addition, the L107MA militarized version meets severe military specifications for altitude, rate, salt and humidity. All models are supplied complete with electronics.

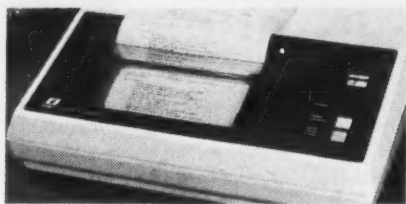


western union data services company

Printer Handles Communications, Computer Output

ATLANTIC CITY — Communications and computer output can now be printed noiselessly on ordinary paper with the DI-240 magnetic printer from Data Interface, to be shown at booth 309.

The impactless printer, suitable for desk-top operation, is smaller than most electric typewriters and prints at speeds



DI-240 Magnetic Printer

up to 240 char./sec. The input data is available for viewing, a line at a time, one-third of a second after it is received, the firm said.

The DI-240 is a solid-state printer. The 96 Ascii characters are formed by a 10 x 12 matrix from a LSI character generator. The font uses upper and lower case and can be changed to Russian, Hebrew or Greek by replacement of an electronic component. Graphics are automatically accommodated by adding an option.

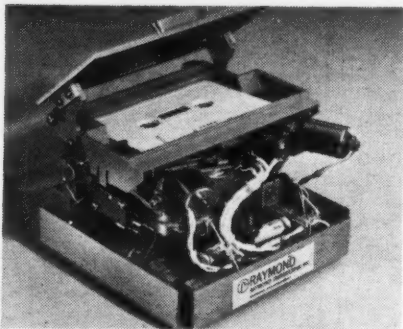
The DI-240 needs no special paper or high voltages. The unit accepts serial or parallel data entry in Ascii or Baudot code and operates asynchronously at rates up to 50,000 bit/sec.

The printer is compatible with TTL logic or RS-232.

Cassette Recorder Intended for Minis

ATLANTIC CITY — The Raycorder Model 6406, a digital cassette recorder suited for minicomputers and other data product equipment, will be featured in booth 1717. The product of Raymond Engineering Inc. is a transport designed for maximum up-time and superior performance in digital recording, the firm said.

Bidirectional and unidirectional operation are available with dc capstan drives. Packing density up to 800 bit/in. can be accommodated. Tape speeds are from 3 to 15 in./sec in the transfer mode.



Raycorder Model 6406

Sonex to Feature Modems In Voice Response System

ATLANTIC CITY — A demonstration of a voice response system using a Sonex Model 302 automatic-answer modem will be conducted by Sonex Inc. at booth 2303.

Automatic Touch-Tone modems designed to replace the Bell 401 and 403 units will also be shown. These units can be used in voice response computer systems as well as other on-line systems with Touch-Tone inputs.

Sonex will also exhibit automatic-answer modems, Touch-Tone equipment, data couplers, Bell data set replacements, data access units, multiplexers and OEM equipment.

Fabritek Shows Fast Core

ATLANTIC CITY — A new core memory, the Model 688, will be introduced at booth 1210 by Fabritek, Inc.

The high-speed model features a 20-bit word in capacities of 32K (or 64K by 10-bits) on a single 15-in. by 21-1/2-in. board. The memory may be field-expanded to 64K, 128K, 256K or 512K with up to eight modules operating from a single timing and control assembly.

Full cycle time is 1.2 μ sec with a 500-nsec access time. Model 688 architecture is 3D, 3-wire.

Displays Are Multichannel

ATLANTIC CITY — Graphic display systems and plug-in minicomputer memories will share the spotlight at the Data Disc display at booth 1117.

The multichannel, graphic display systems are designed to provide up to 16 independent display channels to drive low-cost TV monitors in a multitiered configuration.

The minicomputer disk memories offer capacities from 42K words to 1,536K words for most minicomputers. Access time is 17 msec and high-speed data transfer rates (to 250,000 word/sec) are featured.

For OEM Uses

RFL Modems Start at 300 bit/sec

ATLANTIC CITY — The RFL Industries line of Bell-compatible data modems range from 300 to 2,400 bit/sec.

The series includes the RFL DM1200 (Bell 202C compatible), DM1800 (Bell 202D compatible) and DM2400 (Bell 201 compatible).

Each modem is of a printed-circuit card design for OEM applications and is also available in an enclosure that accommodates a modem with power supply for stand-alone versions.

Also on display in booth 1716 will be delay and amplitude equalizers, acoustic couplers, FDM data systems and the Model TM 3000 TDM system. The TDM offers the latest state-of-the-art design including automatic central logic backup; total system monitoring and alarm capability; inputs up to 4,800 baud; 1,200 bit/sec to 240K bit/sec multiplexed line rate; expansion to 156 channels; code transparent operation and total speed-mixing features, the company said.

These products will be combined with thermal page printers and CRTs incorporating I/O magnetic tape cassettes, and teletypewriters, offering data systems for specific customer applications.

Card Reader Made For Low-Volume User

ATLANTIC CITY — Documation will introduce a lower-speed mechanical card reader at booth 2330. The DC-150 is produced for the lower-volume card user, the firm said.

Designed with a minimum of dynamic parts, the reader has a read rate of up to 150 card/min and a hopper capacity of 500 cards. Currently designed to read punched cards, the reader will be available with the optical mark sense feature as an option in the near future, the firm commented.

Prices start at \$1,500 and delivery is 60 days beginning in August.



Westinghouse 2550 Satellite Processor

Both an intelligent remote-batch terminal and local-batch processor

As a remote-batch terminal, the Westinghouse 2550 Satellite Processor emulates 2780s, HASP multileaving work stations and other popular RJE terminals. No reprogramming of your host processor or front-end system is required.

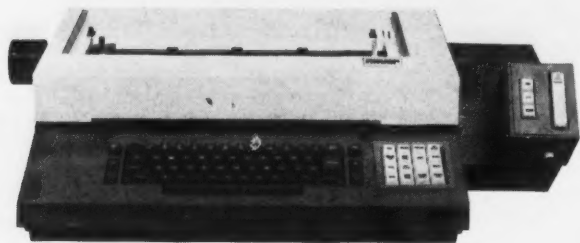
In addition to this compatibility, the 2550 Satellite Processor increases performance. It improves terminal throughput with higher speed peripherals, faster data rates, data compression, and mass-memory devices for remote spooling.

Offline, the 2550 Satellite Processor provides fast, low-cost batch processing for your scientific, engineering, and business needs. Software support packages include FORTRAN, BASIC, RPG, and numerous assemblers.

Most important, the Westinghouse 2550 Satellite Processor has enthusiastic user acceptance, and is available now! Take advantage of Westinghouse experience as a supplier and as a user. You get single-source leasing, maintenance, and nationwide sales and service. For the answer to your needs, call Westinghouse Computer and Instrumentation Division, Computer Department, Orlando, Florida. 305 843-7030.

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Novar 5-50 and 5-60 terminals record a full day's typing on tape—up to 73,000 characters on a single cartridge—ready for batch transmission at high speeds via telephone line. When transmission is to a Novar 7-70 data collector, the terminals and 7-70 together provide a complete telecommunication system.

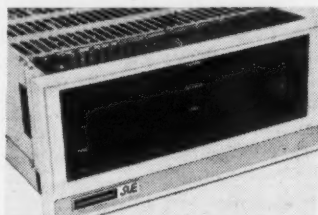
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GTE INFORMATION SYSTEMS INCORPORATED

Lockheed's SUE Engineered for User

ATLANTIC CITY — The latest computer developed by the Data Products Division of Lockheed Electronics Co., Inc. will be shown at booth 1621. The "System User Engineered" minicomputer (SUE) is designed to permit selection of required system functions by the user engineer.

The SUE minicomputer is con-



Lockheed's SUE

figured from a series of independently operating system modules each on a pluggable circuit card. In addition to a selection of

standard configurations, SUE minicomputer systems can be custom assembled starting from a minimal unit of bus, bus controller, processor and 4K of memory.

Asynchronous communication between modules on the bus board is monitored by a bus controller at 200-nsec intervals allowing direct memory transfers up to 5M word/sec.

System users have a choice of four memory modules — two core and two LSI — intermixed in any combination. Core mod-

ules are 4K or 8K by 16 with a system capacity of 30K words. LSI modules are 1K x 16; one is a user-customized ROM, the other a RAM memory with 160-nsec access time.

A SUE computer with processor, 4K memory, control panel, power supply and chassis sells for \$4,295 (with discount to \$2,577) in 100 quantities. An 8K version of the same system sells for \$5,895 — quantity 100 discount at \$3,537; 16K version is \$9,795 and \$5,877 in quantities of 100.

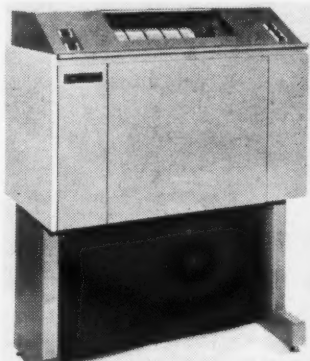
600 line/min Printer Set

ATLANTIC CITY — The 400C from Vogue Instrument Corp., a medium-speed, impact printer, with a carriage width of 132 characters and a print speed of

600 line/min, will be shown at booth 1620. The unit is matched to the latest minicomputer speeds and capabilities.

The printer is suited for high-speed telecommunications applications, the company said.

Vogue provides complete interfacing, including on-site equipment installation, for: DEC PDP-8, PDP-11, PDP-15; Hewlett-Packard HP-2100 Series, Data General Nova; Varian 620; Honeywell 316 and 516; as well as Western Electric 201 and 202 or equivalent data modems.



Vogue 400C Printer

3M Prepares Disk Cartridges, Packs

ATLANTIC CITY — Featured at the 3M Company Magnetic Products Division booth 2107 will be the Scotch brand 901/902 cartridges.

Another cartridge on display will be the Scotch 903-0 disk cartridge which is fully compatible with the IBM disk drive used in System 3 and with the System 7.

The Scotch 906 and 911 disk pack will also be shown. These 3M products are designed for all IBM 2311- and 2314-compatible disk drives respectively.

Scotch 700 Black Watch computer tape, which guards itself against physical damage and loss of recorded data, and Scotch brand 8133 digital cassette, manufactured to meet Ansi and Ecma standards, will also be exhibited. The 8133 housing is fiberglass reinforced and features interlocking joints to keep out dust and provide extra rigidity to insure proper tape guiding, 3M said.

Also displayed will be the C142 self-threading computer tape cartridge, fully compatible with all IBM 2420- and 3420-type automatic threading tape drives.

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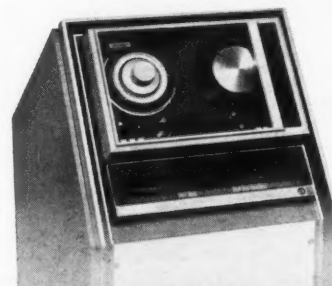
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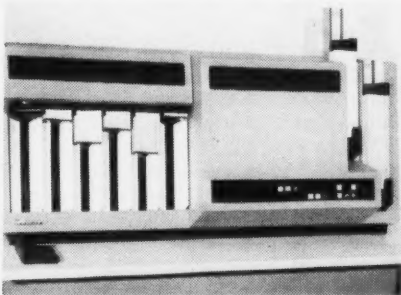
XLO Includes Mini in Display

ATLANTIC CITY — XLO Computer Products will introduce, at booth 2222, the XLO-8 Minicomputer, the Series 7700 remote batch terminal system and XLO 3301 disk memories and XLO 3322 cartridge drives.

Decision Data Shows 96-Column MFCU

ATLANTIC CITY — Decision Data Computer Corp. will exhibit five members of its family of 96-col card peripherals and auxiliary equipment at booth 409.

The 9650 Multifunction Card Unit (MFCU) will be shown for the first time. The high-performance card peripheral is



9650 Multifunction Card Unit

a fully buffered card reader and printing punch with dual input hoppers, a common card path and six output stackers. The 9650 has been specifically designed as a full-function, 96-col card I/O device for OEM application.

The company noted that the performance, characteristics and cost of the 9650 compare favorably with the 80- and 96-col MFCUs from IBM and are proven in use with both the IBM 360 and the System 3 computers.

The standard 9650 is a free-standing unit complete with casework and mechanism, power supply, convenient operator panel, basic electronics, data buffers and computer interface. The 9650 sells for \$11,600 with OEM quantity discounts available. Delivery is six months.



Video Terminal

The Centronics Model 401 video terminal will be exhibited in booth 422 as part of the Centronics exhibit. The company will also show its Model 101 and the Model 101A line printers.

Peripherals Highlighted

ATLANTIC CITY — The Per Data exhibit at booth 1106 will be built around the company's line of minicomputer peripherals including magnetic tape and disk drives and printers.

The company will demonstrate its magnetic tape transport disassembled, stressing simplicity of design and operation.

Per Data's magnetic tape drives use a single design for units with speeds ranging from 25 to 75 in./sec.

Self Copy Carbonless Paper Makes Up to 12 Legible Copies

ATLANTIC CITY — Self Copy carbonless multi-original paper, to be shown by Computer Copies Corp. at booth 427, can produce up to 12 legible copies on high-speed printers, a minimum of six copies on low-impact terminal printers and up to 20 legible copies on a typewriter.

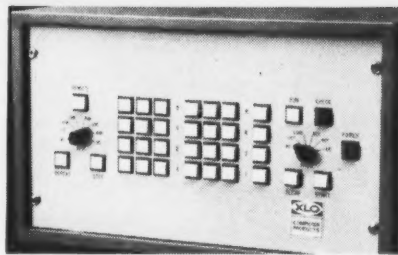
The XLO-8 minicomputer is intended for data communications and process control applications, the company said.

Engineered to function as a medium-size computer, the XLO-8 offers as standard: 64 bytes of expandable ROM, 4K bytes of expandable core, TTY interface, seven levels of priority interrupt and 500,000 byte/sec I/O.

The Series 7700 Communication Terminal System consists of a programmed computer-controller, a line printer and a card reader. The 7700 computer-controller has its own main memory core and read only memory. The 7700 line printer prints 132 col/line at 600 line/min. The card reader reads 300, 80-col card/min.

Options include tape units, teletype-writers, card punches and other peripherals which can be configured with the 7700 to give the user a total communications terminal system, the firm said.

The XLO 3301 Disk Memory is a head-per-track storage device offering a capacity of 1M to 10M bits. Its average access time is as low as 8.3 msec, and it has a



XLO Minicomputer

data transfer rate of 2 to 5 Mbit/sec. The 3301 offers many standard features such as self-contained electronics, non-contact heads and pressurized filter enclosure for consistent performance.

Large computer technology is also found in the XLO 3322 Cartridge Drive. The 3322 is a positioning-head memory device with a capacity of 75 Mbits in a standard removable disk cartridge configuration. Memory capacity can be increased to 150M bits with an optional fixed disk.

The 3322's average rotational latency is 8.3 msec. Its average head positioning time is 35 msec and its data transfer rate is 6.5 mbit/sec.

Memory Comes As Digital Stack

ATLANTIC CITY — Standard Memories, Inc. will show the "designer choice" Ecom F Series of core memory as a digital stack or as a packaged system for any memory application, at booth 1018.

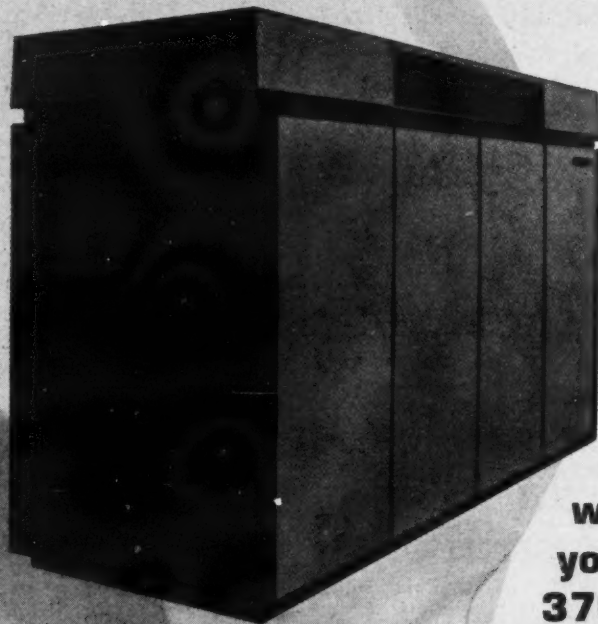
The Ecom F Series is available as a digital stack module in any capacity from 4K by 8 bits through 4K by 18 bits; or as a packaged system yielding 4K by 8 to 16K by 18 in a 5-1/4 in. enclosure, or a 16K to 64K in a 12-1/4-in. height enclosure.

The Ecom F Series is designed to eliminate tradeoffs of size, speed or economy and to offer the widest range of configurations at low price to the designer, the company said.

Circuit Simulation Slated

ATLANTIC CITY — AEDCAP, the computerized electronic circuit simulation system by Softech, Inc., will be demonstrated at the Princeton Electric Products booth 1610.

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Printers Avoid Guide Lubricant

ATLANTIC CITY — A line of low-cost, medium-speed impact line printers will be shown at booth 1616 by Odec Computer Systems, Inc. The Series 1300 printers feature impact plastic hammers and character clips designed to eliminate the need for lubrication on the clip guides.

The Series 1300 consists of three models, the 1321, 1322 and 1323, with an average speed from 110 to 250 line/

min. Both Ascii and Ebcidic 7-bit codes are available with 48-, 64- and 96-character fonts. Each character slug can be snapped on or off the carrier belt in seconds, the company said.

The printers are equipped with logic that automatically examines and adjusts each line to maximum possible speed for particular character content. The units are fully buffered with all electronics included. In most units only a cable is required for interfacing, the company said.

Techtran Terminal Mini-Compatible

ATLANTIC CITY — Techtran Industries Inc. will be showing its 4100 Communications Terminal at booth 1220. The Techtran terminal is a plug-in cassette unit that is compatible with most data terminals and minicomputers.

The 4100 features switch-selectable speeds from 110 to 2,400 bit/sec, high-speed search, full remote control, data edit capability and the ability to rewrite data and to shrink or expand already recorded data files, auto answer for unattended data station operation, switch-selectable on-line/off-line operations and switch-selectable non-printing.

The basic terminal is priced at \$1,650 and is available on a 30-45 day delivery.



Techtran Communications Terminal

Datapro 40 Available

ATLANTIC CITY — Datapro Research Corp. will introduce Datapro 40, a loose-leaf publication containing 16 reports on current EDP equipment and technology, at booth 2102.

The reports in Datapro 40 are excerpts from Datapro 70, a three-volume reference service.

The 300-page looseleaf volume includes 97 pages of comparison charts which summarize the characteristics of current minicomputers, modems, optical readers, communications processors and computer output microfilm.

Other reports discuss independent tape and disk drives, plug-compatible main memories, data entry devices, data communications facilities, time-sharing services, software package acquisition and EDP conversion planning.

Datapro 70 may be ordered for \$40 until June 1. After that the price will be \$48.50. An optional quarterly updating service is available at an additional cost of \$50 per year.

Facit Shows I/O Typewriters, Tape Readers and Spoolers

ATLANTIC CITY — Facit-Ohdner, Inc. will be featuring its line of OEM equipment including inexpensive I/O typewriters at booth 1200.

Facit will also be showing paper tape readers, punches, spoolers and reproducers, digital printers and strip printers.

The three typewriters are Facit's 3841 output typewriter, 3821 input typewriter and the 3851 I/O model with drive electronics combining the features of both the 3841 and 3821 units. Basically the same typewriter as Facit's electric office typewriter, they are equipped with additional reed relays, solenoids and photo electric cells which enable the units to either transmit or receive or both.

The price of the 3851 is \$1,360; the 3821 Input Typewriter sells for \$940; and the 3841 Output Unit costs \$1,055.



Nortronics Digiwand

Nortronics Digiwand Reads Credit Cards

ATLANTIC CITY — Nortronics Co. will demonstrate two new products at booth 528, the Digiwand and LTC hard-coat development. Also shown will be the company's line of magnetic recording heads.

The Digiwand, a hand-held magnetic wand, is intended to be used with point-of-sale terminals to read magnetically encoded merchandise tags and credit cards that conform to American Banker's Association (ABA) and International Airline Transportation Association (IATA) standards.

The LTC coating (Life Time Ceramic) is used on a line of magnetic heads that are said to provide 10 times normal life.

Other exhibits include read/write cassette heads for .150-in. systems in digital applications, read-after-write cassette heads designed to have reduced crossfeed characteristics, and a series of 7- and 9-channel dual gap NFG (No Flux Gate) heads for digital applications.

Beehive Terminal Uses Raster Tube Design

ATLANTIC CITY — A versatile new computer system terminal, with increased information display capabilities, made possible through low-cost raster tube design techniques, will be introduced by Beehive Terminals, at booth 2328.

The Beehive Model V offers independent alphanumeric and graphic displays with internal memory capacity. A stand-alone graphic option on the

Model V is available for Beehive Terminal Models I, II and III, the company said.

The point-plot feature of the Model V allows users to point out specific spots on a graph. Other features of the Model V include automatic hardware interpolation, remote TV drive capability, graphic input rate up to 15,000 point/sec, single graphic and alphanumeric interface and graphic blink capability.

DUO 360/370 shrinks OS manpower conversion costs up to 90%.

Going from DOS to OS is a battle.

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For another, OS test time is an obstacle. DUO cuts it by as much as 90%.

And in the conversion, departmental morale suffers heavily. DUO removes the pressure, by removing the need to reprogram everything at once.

What is DUO 360/370? Some kind of knight in shining armor?

If you're captured in the OS conversion process, it is. Because DUO permits most DOS object programs to fully access OS facilities without reprogramming. Your DOS supervisor is not needed. And that makes DUO unique in

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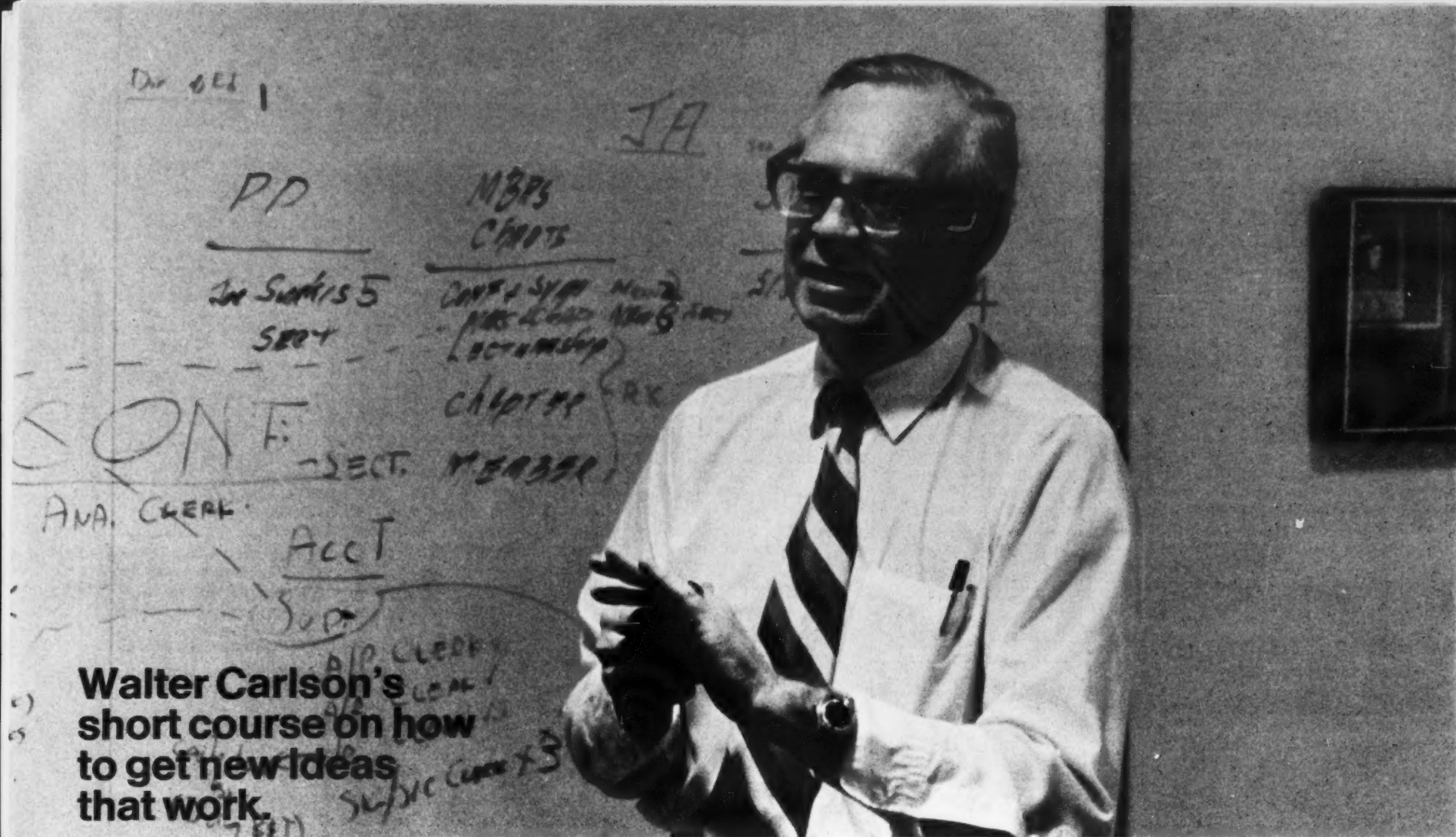
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Page 39

CI Notes

AT&T to Unveil 208

ATLANTIC CITY, N.J. — AT&T is planning to announce its 208 data set at the SJCC here next week.

Described as a replacement for the Bell 203 data set, the new modem can operate at 4,800 bit/sec and will be limited initially to private line services. The device will include automatic equalization capabilities.

Xerox Completes Diablo Deal

SAN FRANCISCO — Diablo Systems, Inc., formerly an Intel-owned manufacturer of computer disk drives and an electronic communications printer, has become a wholly owned subsidiary of Xerox Corp.

Under terms of the acquisition, Xerox is issuing 84,000 of its common shares for all of the common shares of Diablo. It also is issuing an additional 121,000 common shares for all of the Diablo convertible preferred shares, all owned by Intel, which provided the principal financing for Diablo.

Com-Share Injunction Upheld

ANN ARBOR, Mich. — A Federal Court of Appeals has upheld an injunction preventing Computer Complex from divulging system software developments made under an agreement with Com-Share to any third parties.

Com-Share and Computer Complex had a technical exchange agreement covering system software development before Computer Complex announced a tie-up with Tymshare. Com-Share sued successfully to bar Computer Complex from passing on any proprietary information to Tymshare.

Aussie Mini Sales Boom

SYDNEY, Australia — Off-the-floor sales to the value of well over \$3 million were made during the five-day minicomputer exhibition at the U.S. Trade Center here recently.

Exhibitors estimated that other leads would result in further sales to the value of around \$25 million over the next 12 months.

Supershorts

Telex International Inc. has signed an agreement with Ampex World Operations, S.A., for the exclusive rights to purchase core memory products for leasing in Europe.

The data communications market, which presently exceeds \$600 million annually, is projected to reach \$6 billion to \$10 billion by 1980, according to University Computing Co.

Peripherals General, Inc. has announced an agreement for the sale of Model 844 Universal Controllers to Systel Gesellschaft Fur System-Elektronik MBH & Co. KG of Pforzheim, West Germany. Total value of the sale is over \$280,000 and the units will be interfaced to GE415 systems.

A joint marketing effort for Comput-A-Charge, Value Computing's machine accounting and billing system, has been signed by Value Computing, Inc. and Capex Corp.

A \$4 million data center owned by GTE Data Services Inc. has been completed and occupied at Marina Del Rey, Calif.

Independents Face Battle

Memory Market Seen Doubling by 1976

By a CW Staff Writer

The total market for memory equipment — produced both independently and by the mainframe makers — will almost double over the next five years, but the independents will find rough going, according to International Data Corp.

The total amount of installed memory equipment — main memory, disk units, tape drives and other miscellaneous products — will reach \$32.1 billion by the end of 1976, almost double the \$16.7 billion worth of installed equipment at the end of 1971, the firm says.

Prices Dropping

"The main memory sector will experience the most dramatic change," the firm reports, "with total megabytes installed increasing by 259%, but prices dropping so significantly as to cause the total market sector value to grow by only 92%."

During 1971, IDC adds, main memory accounted for 45.5% of the shipments in the total memory market, with shipments valued at \$840 million. By the end of 1971, the total installed value of main memory was \$8.4 billion, but this will increase to \$16.2 billion by the end of 1976, when installed main memory will account for 50.4% of all installed memory products.

In the area of disk drives, IDC says, 23,000 units valued at \$519 million were shipped in 1971, bringing the number of units installed to 135,000 worth \$3.6 billion by year-end 1971. Overall, disk systems accounted for 21.5% of the total memory market at year-end 1971.

By 1976, however, there should be around 165,000 disk units installed in the field with a total value of \$8.3 billion. At that time disk systems will account for 25.7% of the total memory installations.

At present, 2314-type disk drives are clearly the most popular, with 9,000 shipments, valued at \$228 million, during 1971 for a total installed base of 66,000 units worth \$1.9 billion.

Competition Increases

The number of these units will decline over the next few years as competition increases from the 3330-type drives and other new products. By the end of 1976 IDC estimates that there will be only 60,000 2314-type drives in the field with

a value of \$1.7 billion.

Around 5,000 drives of the 3330-type were shipped during 1971, IDC notes, with a total value of \$195 million. The number of units installed will grow by more than 1,000% from the present 5,000 to over 57,000 by the end of 1976. At that time, the 3330-type drives installed are expected to be worth over \$2.9 billion.

In the tape drive area, IDC says 14,000 units valued at \$359 million were shipped in 1971, bringing the total at year end to 122,000 units worth \$3.7 billion.

By year-end 1976, there will be 165,000 tape drives installed, worth around \$4.7 billion. This is a 35% growth in terms of numbers and a 28% growth in terms of value.

Afips Stresses Issues at Joint To Increase Industry Interest

ATLANTIC CITY — The economy continues to be cited as one of the major reasons for the dropping number of exhibitors at the Joint Computer Conferences, despite attempts by the American Federation of Information Processing Societies (Afips) to stir more industry interest in the shows.

The number of exhibitors at next week's spring extravaganza here will be down to around 140 from over 210 at the show last fall in Las Vegas, approximately a 30% drop in the number of exhibiting firms.

Afips likes to compare spring conference with the previous spring conference, however, instead of with the fall conferences.

But here, too, the comparison looks bad, since the last spring meeting here last year also drew over 200 exhibiting firms.

Smaller Exhibits

In addition to the smaller number of firms exhibiting, the size of the average exhibit seems to be getting smaller, with most of the large companies dropping out of the joint conferences for more vertical trade shows.

All of the mainframe makers are gone from the show, except for token representations from the components divisions of some of the computer makers such as Burroughs.

The largest group of exhibitors at last Fall's show — the makers of minicomputers — will also be thinned considerably this spring with both Hewlett-Packard and Digital Equipment Corp. absent. Both of these firms had large displays last fall, and Hewlett-Packard had at one time ordered over 20 booths for the spring show before deciding not to exhibit.

Most of the dropouts from the past shows have indicated they dropped out of this spring's exhibit because of either the economy or because they would rather show in more vertical exhibits.

Components Shows

"We think the joints are becoming primarily components shows," one mini maker said, "and we would rather put our money into shows that attract end users in specific application areas."

Among Afips moves to reverse this trend was the formation of an industry advisory panel to help make the JCCs more responsive to industry needs.

Its purpose has since been expanded to make Afips itself more capable of responding to those needs.

One of the recommendations of that panel reportedly was to adopt a regional format for the JCCs, whereby there would be three or four localized conferences, and one large national conference per year. The possibility has not been ruled out, Afips reported.

Other actions and projects also reflect Afips concern with the state of the economy, and Keith Uncapher, president of the organization, will deliver a special state-of-the-industry address on Wednesday morning.

Temperature Independent Core

Ampex Claims Memory Advance

MARINA DEL REY, Calif. — Ampex Corp. has developed a temperature independent (Tim) material for computer core memories, the first breakthrough in core technology since 1962, the firm claimed.

Cores made of the new, proprietary material can operate over a temperature range of -25° C to +100° C without temperature compensation, according to Eugene Prince, vice-president and general manager of the firm's Computer Products

Division.

The new material, according to Victor Sell, senior core product manager, "will permit savings as much as 25% in the design and manufacture of core components, depending on size and application."

Current lithium cores require temperature-compensating electronics to operate consistently, particularly on large storage units which have critical air flow requirements for performance consistency at all address locations.

Minis to Benefit

Temperature independence will be particularly critical for minicomputers, used in uncontrolled environments such as factories and warehouses, Ampex predicted.

With the new units, design costs can be reduced because temperature-compensating electronics can be eliminated, including most thermal sensing devices, heat sinks and blowers, according to Sell.

A core stack's optimum operating point remains constant and the operating envelope is unchanged despite temperature variations when using the new material, the firm added, which allows manufacturers to avoid excessive testing and rework due to extreme temperature failures.

Presently, the firm said, 18-mil cores made of the new material are in production and have been provided to some customers for use in commercial and government systems.

The firm said the new material will be used in most Ampex memory products sold to computer manufacturers and directly to end users.

Telex Decides to Buy ISS Disk Controllers, Drives for Its Units

TULSA, Okla. — The mystery of whose 3330-like disk system will be marketed by Telex here appears to be resolved with the announcement that the firm will buy disk drives and controllers from Information Storage Systems (ISS), an Intel subsidiary.

Telex previously said it was going to build its own controllers and buy the drive from ISS. Then it phased out of its internal controller development and signed a contract with Century Data Systems, a Calcomp subsidiary for controllers and drives.

Recently, the agreement with Century was cancelled and Telex turned to ISS for the complete systems. The agreement is non-exclusive and Intel will continue to market the units directly to end users also.

While figures for the contract were not given, a specified number of units has to be purchased by Telex.

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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Bearinger Named an HIS Vice-President

MINNEAPOLIS — Dr. Van W. Bearinger was named vice-president of science and engineering at Honeywell.

Associated with the firm's advanced technology activities for 22 years, Bearinger will direct research activities at the Corporate Research Center in Hop-

Executive Corner

kins and the Solid State Electronics Center in Plymouth, Minn.

He is responsible for advising corporate management on promising technical areas and for assuring a close link between corporate research and the company's operating units.

Other Moves

■ Potter Instrument Co. has appointed three new vice-presidents. William R. Arnold is vice-president, business planning and development. Vincent L. Jones, formerly with RCA, was named vice-president, manufacturing, and Sigurd Hoyer vice-president, research and development.

■ Donald B. Thompson has been appointed chairman, president and chief executive officer of Scan-Optics, Inc. Richard J. Coburn was named corporate vice-president.

■ Hugh J. Kern has been elected president and member of the board of Signetics Memory Systems, Inc.

■ Robert A. Leonard has been named president and chief executive of Compuscan, Inc.

■ J. Thomas Markley is now president of Raytheon Data Systems Co.

■ Richard A. Walter has been appointed president and chief executive officer of Scientific Computers, Inc.

■ Harrison J. Martell has been appointed president of the Advanced Retail Systems Division of Litton Industries.

■ Thomas Cleary has been named vice-president, business administration for the Information Storage Systems Division and Joe D. Foster vice-president,

marketing, of the Data Products Group of Intel Corp.

■ E. Richard Williams is vice-president, marketing and support services for Computer Machinery Corp.

■ Spencer F. Martin Jr. has become vice-president of Odec Computer Systems, Inc.

■ G. Eric Jackson has been elected vice-president, engineering, of Memory Technology, Inc.

■ Robert F. Stafford has been appointed director of corporate development at Automatic Data Processing, Inc.

■ David S. Andrews has been

named vice-president, marketing for Computer Consoles, Inc.

■ L.R. Jeffrey Jr. has been appointed vice-president, marketing, of Data Trends, Inc.

■ Andrew C. Knowles has been elected a vice-president and group manager of Digital Equipment Corp.

■ Richard E. Bowers has been named vice-president, and Lewis J. Beck vice-president, finance, of Trilog Associates, Inc.

■ E.F. Smith has been elected assistant vice-president, operations analysis, of Burroughs Corp.



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Display Area Will Grow Fast, But Study Cites Shake-Out

PENNSAUKEN, N.J. — While the alphanumeric display field is rapidly growing, the number of companies serving the market is declining, according to a report from Alltech Computer Systems, Inc.

The present worldwide installed base of such devices including government installations is 200,000 units, the firm says.

Over the next five years, the report predicts, an additional 800,000 units will be shipped resulting in an installed base at the end of 1976 of one million units, the firm notes.

The growth in shipments will average approximately 35% annually, Alltech says.

At the same time, the report notes the number of companies supplying equipment to the market had already dropped from almost 100 during 1969 and 1970 to between 50 and 60 firms today.

The costs of the equipment used will also drop over the next few years, Alltech adds, predicting a 5% to 10% price reduction per year for each of the next five years.

Presently the primary users of displays are large computer installations, and this will change as more medium and small installations begin utilizing the displays during the next five years, Alltech says.

Small Users Coming

The primary markets for the next two to three years, however, continue to be the top 1,000 companies in the U.S. and similar firms overseas. After that, smaller companies will "ever increasingly take advantage of not only lower prices but also the development of systems and software which will address a broadening range of their specific problem areas."

Outside of the U.S., the firm predicts

the use of displays will closely follow the expanding computer markets, with key countries being Canada, the UK, West Germany, Japan, France and Italy.

"It is projected," Alltech adds, "that during the next five years many U.S. companies can expect from 20% to 50% or more of their revenues to result from international sales activity."

Manufacturing Growth

The largest user of display terminals by the end of 1976 will be the manufacturing and trade area, Alltech states, with 250,000 terminals installed, up from a base of 30,000 today.

This area will be followed by general services with 200,000 terminals, up from 40,000; financial services with 200,000, up from 60,000; special services with 200,000, up from 25,000; and government with 150,000 terminals, up from 45,000.

While the market is large and growing, however, the computer makers are expected to capture the largest share of the market over the next five years, according to Alltech.

"For the independents," the firm says, "it is expected that they will share in some 200,000 unit shipments over the next five years. These shipments are expected to be captured by the 40 to 50 relatively small alphanumeric display companies along with small groups of divisions of other types of companies, including those smaller companies that fail during the next five years."

The small companies in the field presently share only about 15% of the market, Alltech notes. Between them, Bunker-Ramo and IBM supply about 40%, it explains. Raytheon, Ultronic and Sanders split about 30% of the market.



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Data Products Core Memory For Minis Accesses in 250 nsec

WOODLAND HILLS, Calif. — A high-speed, large-capacity core memory system designed for use in minicomputers has been developed by Data Products Corp.

The low-cost Store/336 has an access time of 250 nsec and a cycle time of 650 nsec. Basic capacity is 8K words by 18 bits in a 2-in. by 8-in. by 11-in. package.

The combination of a low price, high speed and large capacity make the Store/336 ideal as a mainframe or add-on memory in the newest minicomputers and other systems being developed today, the company said.

Store/336 can be expanded to 32K by 18 bits in a 5-1/4-in. chassis, to 64K by 18 bits in an 8-3/4-in. chassis, or to 256K by 18 bits in daisy-chain configuration.

The basic memory is assembled on three boards and weighs 3 lbs 4 oz.

Additional Store/336 features include low power consumption and low maintenance requirements.

New OEM Products

Reliability is enhanced through 8K sense winding at low component count, the company said. A byte-control feature is optional. Delivery is 90 days.

Computer Automation Adds 'Jumbo' Versions to Naked Mini, Alpha Line

NEWPORT BEACH, Calif. — Computer Automation, Inc. is expanding its OEM systems market with "Jumbo" versions of the Naked Mini and Alpha minicomputers.

Designed to meet OEM requirements for large-scale minicomputer-based systems, the Jumbo minicomputers incorporate up to 32K 16-bit words of core memory and accommodate up to 12 plug-in I/O peripheral interface modules.

The Jumbo computers also incorporate fully parallel processors with the instruction sets.

Unit prices for the Jumbo Naked Mini with 32K, 16-bit words of core memory are \$11,115 for 200 unit orders and \$13,000 for 10 units. Unit prices for the Jumbo Naked Mini with 4K, 16-bit words are \$2,195 for 200 units and \$2,730 for 10 units.

Computer Automation, Inc. has also announced a new parity option and two general-purpose relay I/O options for the Alpha and Naked Mini CPUs.

Other New Products

An MOS encoded keyboard, featuring "N" key rollover and a single 4-pin ceramic MOS chip for random pair coding of up to 64 keys, is available from Controls Research Corp., Santa Ana, Calif., for general application on computer communications and data entry terminals.

Motorola has announced the MCM1172L and the MCM1175L dynamic MOS Rams, 1K-bit memories with a wired-OR capability for memory system expansion in multiples of the 1K by 1-bit array.

The MCM1100 Series of custom-programmable ROMs, is offered with a memory capability of from 2K to 4K bits in a variety of word lengths. Each of the five PMOS, metal-gate ROMs is offered as a custom, mask-programmable memory with additional devices available preprogrammed to standard formats.

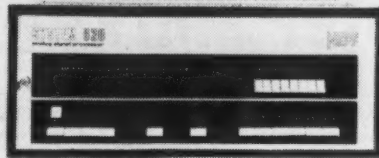
A compact amplifier/channel analog signal processor in the price range of low-level multiplexed systems, the System 620 from Neff Instrument Corp., Duarte, Calif., provides individual amplifiers and filters for up to 64 input channels.

Cyberex, Inc., Willoughby, Ohio, has developed a line of integrated package line voltage regulators for computers, process instruments and communications gear.

Two MOS/LSE Core Compatible Modular Memory Cards for small and intermediate memory systems, the AMS 6001 and AMS 6002 from Advanced Memory Systems, Sunnyvale, Calif., are available in capacities from 4K by 8/9 bits to 64K by 16/18 bits, respectively. Cards using the 2K 6003 component have twice the above capacity.

Cogar Corp., Wappingers Falls, N.Y., has two high-speed (80 nsec access) N-channel MOS memory modules of 1K and 2K bits available for immediate delivery. The units are designed to fill the gap between bipolar memories and P-channel modules, the company said.

A 1K-bit MOS dynamic R/A memory from Fairchild Semiconductor can serve as a pin-for-pin replacement for the 1103



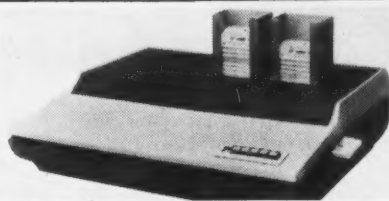
Neff 620 Signal Processor

MOS RAM while eliminating critical timing constraints, according to the company.

A multilaminate construction technique used by Display Devices, Inc., Encinitas, Calif., makes low-cost custom-fabricated, light-emitting diode display panels up to 30 in. by 40 in. available.

A series of regulated power supplies from Elexon Power Systems, Irvine, Calif., provides 15 different output voltages from 4 Vdc to 28 Vdc with current ratings of 6A to 1.7A.

The Scotch Brand 8133 digital cassette from 3M Co. meets design standards established by Ansi and Ecma and features a fiberglass reinforced housing with interlocking joints.



Data Instruments Cassette Duplicator.

The Librascope Display Control Trackball from the Librascope Division of the Singer Co. is said to provide higher pointing resolution without data masking and to save software time.

Microdata Corp., Santa Ana, Calif., has made its general-purpose I/O controllers are intended for interface applications are not covered by standard controllers.

The Automatic Audio Cassette Duplicator from Data Instruments Co., Sepulveda, Calif., with rugged construction and operational simplicity, costs \$2,950.

The Dataspan 410 Coupler from Ambient Systems, Inc., Santa Clara, Calif., is described as the only solid state instrument coupler for under \$1,000.

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PRODUCT SALES ANALYSIS BY SALESMAN 1 JULY-DEC

SALESMAN	JULY	AUGUST	SEPT	OCTOBER	NOVEMBER	DECEMBER	TOTAL	AVERAGE
ADOLPH LUTERMAN	10000	15000	12000	18000	14000	16000	85000	14166
DAVID FRANCES ARCHER	8000	10000	9000	11000	12000	13000	63000	10500
FRANCIS HYLAND	6000	7000	8000	9000	10000	11000	47000	7833
JOHN LIVESBY	4000	5000	6000	7000	8000	9000	39000	6500
EDWARD C. JANSEN	2000	3000	4000	5000	6000	7000	27000	4500

NEW ACCOUNT DEFENSE AND 4TH QUARTER SALES

SALES	DATE	CUSTOMER	LOCATION	SALES	DATE	CUSTOMER	LOCATION	SALES	DATE	CUSTOMER	LOCATION	SALES	DATE	CUSTOMER	LOCATION
001	07/01	MOBILE ALABAMA	MOBILE	100	07/01	MOBILE ALABAMA	MOBILE	100	07/01	MOBILE ALABAMA	MOBILE	100	07/01	MOBILE ALABAMA	MOBILE
002	07/01	PORT WILTON FLORIDA	PORT WILTON	100	07/01	PORT WILTON FLORIDA	PORT WILTON	100	07/01	PORT WILTON FLORIDA	PORT WILTON	100	07/01	PORT WILTON FLORIDA	PORT WILTON
003	07/01	BIRMINGHAM ALA	BIRMINGHAM	100	07/01	BIRMINGHAM ALA	BIRMINGHAM	100	07/01	BIRMINGHAM ALA	BIRMINGHAM	100	07/01	BIRMINGHAM ALA	BIRMINGHAM

BAR GRAPH OF SALES BY SALESMAN

SALES	DATE	CUSTOMER	LOCATION	SALES	DATE	CUSTOMER	LOCATION	SALES	DATE	CUSTOMER	LOCATION	SALES	DATE	CUSTOMER	LOCATION
001	07/01	MOBILE ALABAMA	MOBILE	100	07/01	MOBILE ALABAMA	MOBILE	100	07/01	MOBILE ALABAMA	MOBILE	100	07/01	MOBILE ALABAMA	MOBILE
002	07/01	PORT WILTON FLORIDA	PORT WILTON	100	07/01	PORT WILTON FLORIDA	PORT WILTON	100	07/01	PORT WILTON FLORIDA	PORT WILTON	100	07/01	PORT WILTON FLORIDA	PORT WILTON
003	07/01	BIRMINGHAM ALA	BIRMINGHAM	100	07/01	BIRMINGHAM ALA	BIRMINGHAM	100	07/01	BIRMINGHAM ALA	BIRMINGHAM	100	07/01	BIRMINGHAM ALA	BIRMINGHAM

PERCENT OF SALES BY YEAR AND TOTAL SALES FOR EACH YEAR

SALESMAN	1967	1968	1969	1970	1971	1972	TOTAL
ADOLPH LUTERMAN	10000	15000	12000	18000	14000	16000	85000
DAVID FRANCES ARCHER	8000	10000	9000	11000	12000	13000	63000
FRANCIS HYLAND	6000	7000	8000	9000	10000	11000	47000
JOHN LIVESBY	4000	5000	6000	7000	8000	9000	39000
EDWARD C. JANSEN	2000	3000	4000	5000	6000	7000	27000

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Control Computer Market May Hit \$424 Million in '76

PALO ALTO, Calif. — The market for computer systems in industrial automation equipment is expected to boom, but the field will be dominated by current suppliers with little hope for newcomers, according to a study by Creative Strategies Inc. (CSI) here.

During the next five years, the market will show a compound annual growth rate of 19%, the firm said, growing to \$424 million by 1976.

Growth Potential

Each of the five major markets for such equipment presents obstacles to competitors, CSI said, and while there is potential for expansion into new market areas for the firms already in the business, there is "little likelihood" of success in the near future for new entrants.

The five major user industries will be petrochemical, metals and minerals processing, electric power generation and distribution, discrete parts manufacturing and other process industries such as pulp and paper and textiles.

Sales of control computers to the electric power industry are expected to grow at a compound annual rate of 28%, and this industry is expected to make increasing use of control computers in hierarchical configurations, the study said.

In the discrete parts manufacturing segment, 70% of numerically controlled machine tools are expected to utilize some form of computer control by 1976, and potential also exists for information — and communications-oriented control computers.

The petrochemical industry application, with heavy emphasis on sophisticated instrumentation, has stimulated significant interest from instrumentation-oriented suppliers such as Foxboro and Honeywell. Revenues from this application are expected to reach \$140 million by 1976.

Among the competitors, Digital Equipment Corp. has a dominant position in the overall market, in terms of both units and revenues.

Measurex, as a complete control system supplier, is expected to experience the most dynamic growth over the five-year period, while General Automation and Data General will also see significant gains, the firm said.

Trends identified by Creative Strategies include: an increasing implementation of the computer

hierarchy approach; growth in the use of microcomputers and programmable controllers; increasing emphasis on the development of interactive graphics to interface with the control computers; and a shift toward more sales directly to end users.

The control computer industry

is generally characterized by competitive barriers consisting of a required high level of marketing, technological and application expertise, as well as a need for stability in the industry. Thus, it is unlikely that new companies will emerge over the next five years.

Sigma 8 Computers Used To Simulate Air Traffic

ATLANTIC CITY, N.J. — The Federal Aviation Administration has ordered a Xerox Sigma 8 to simulate air traffic conditions as part of a study of the future demands of U.S. air transportation.

The system, valued at \$680,000, joins a Sigma 5 at FAA's National Aviation Facilities Experimental Center here and will permit the running of two or three simulations concurrently.

The major duties of the new system will be the generation of simulated air traffic conditions in the National Air Space Systems, the en route air traffic control system being installed at 21 centers and the Automated Radar Terminal System (Arts-III) which is the traffic control system for airports.

Other Orders & Installations

Nordstrom Best, Inc. retail stores has ordered 200 NCR 280 point-of-sale terminals. Grand Central Stores has ordered 104 NCR 280 terminals.

The Jackson Co., a Birmingham mortgage banking institution, and Kason Hardware Co., Binghamton, N.Y., have ordered Univac 9214 C systems. Jackson will use the system for mortgage account-

Orders & Installations

ing, investor reporting, mortgage warehousing and insurance accounting. The Kason system will perform order entry, inventory, billing and other accounting procedures.

The Suffolk Cooperative Library System, Bellport, N.Y., has ordered an NCR Century 100 to be used in book acquisitions, circulation control and most accounting functions.

Abraham & Co., a New York brokerage house, has ordered a Univac 9300, and Wyoming Valley Distributing Co., Wilkes-Barre, Pa., has installed a Univac 9300. Univac 9311s have been installed at Research Computers, an Oklahoma City business school and service bureau, and Records Automation, a Frederick, Okla., service bureau.

State Farm Automobile Insurance Co. has purchased the Tape Management Software (TMS) system from University Computing Co.

Virginia Commonwealth Services, Inc. has installed a Burroughs B4700 for demand deposit accounting, mortgages and other applications now processed on two B3500s.

Western Data Associates is installing a Burroughs B2500 to increase administrative services to statewide businesses. Walter E. Heller & Co. has ordered two Burroughs B4700s which will replace two B3500s and support the firm's expanding communications network.

Shared Medical Systems has installed 16 IBM Model 3330 disk drives as replacements for 32 Model 2314s.

Photophysics terminals have been installed by Medical Data Systems, Brook Park, Ohio, as the first part of a \$1.7 million order. The terminals, located in doctor's offices, clinics and hospitals, will be linked to a central Univac computer.

The University of Rio Grande do Sul, Brazil, has ordered a Burroughs B6700 valued at about \$1 million. The unit will be used for scientific research, student DP instruction and administrative tasks.

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GTE INFORMATION SYSTEMS

Nickels & Dimes

Turnaround Division: National CSS registered earnings for the year ended Feb. 29 of \$556,868, or 52 cents a share, compared with last year's loss of \$1.7 million.

\$\$\$

Equipment sales to Decimus helped Storage Technology earn \$207,304 for the first quarter ended March 31, compared with a \$1.7 million loss in the same 1971 period.

\$\$\$

Scientific Software broke even, with earnings of \$13,477 or 1 cent a share, in the year ended Jan. 31, compared with 1971's loss of \$443,000 or 33 cents a share.

\$\$\$

Spring dividend time: IBM has declared a regular quarterly dividend of \$1.35 per share payable June 10 to holders of record May 10. Conrac shareholders of record May 22 will receive 15 cents per share payable June 15.

\$\$\$

With the sale of Marshall Data Systems to Mohawk Data Sciences, Marshall Industries incurred an extraordinary loss of \$10.8 million. Marshall has negotiated a plan to restructure its debt.

\$\$\$

Demand for the products and services of the forms industry is expected to enjoy a compound annual growth rate of 7% to 8% according to Standard Register.

\$\$\$

A complaint has been filed with the SEC alleging that Graphic Arts Data Systems violated provisions of the Securities Act of 1933 in the offer and sale of the firm's stock.

Calcomp 9 Months Up

Memorex Scores Profitable Quarter

SANTA CLARA, Calif. — California Computer Products, Inc. (Calcomp) continued its upward trend in the nine months ended April 2 despite a lagging third quarter, and Memorex showed a profitable first period, after incurring heavy losses in 1971.

Calcomp's nine-month earnings and revenues increased, with revenues totaling \$37 million,

compared with \$28.3 million, and earnings rising to \$1.7 million, or 65 cents a share, from \$1.6 million, or 70 cents a share.

Although revenues rose in the third quarter, to \$11.5 million from \$8.5 million in the same period last year, earnings declined to \$476,000 from \$570,000.

Memorex emerged from the first quarter with earnings of

\$158,000, or 4 cents a share, compared with a loss of \$2.3 million a year earlier. Revenues rose to \$34.5 million from \$20.8 million.

In fiscal 1971, Memorex lost \$13.4 million on revenues of \$110.2 million.

Memorex is contemplating selling and leasing back its main manufacturing plant to raise cash, President Laurence Spitters informed stockholders. He also indicated the company was negotiating to obtain the majority interest in ILC Peripherals Leasing Corp. Memorex already holds 10% voting interest.

Milgo, Codex Earnings Improved; Quarter Revenues for Both Rise

NEWTON, Mass. — Two communications-oriented firms, Codex Corp. and Milgo Electronics Corp., showed marked improvements in earnings and revenues for the quarter ended March 31.

At Milgo, sales for the quarter rose 60% to 3.1 million from \$1.9 million in the 1971 period. Earnings totaled \$481,000 or 30 cents a share, quite a change from the loss of \$149,000 or 10 cents a share in the year-ago quarter.

The trend for the six months was equally bright, with sales of \$5.5 million compared with \$3.9 million in the year before.

Earnings rose to \$851,000 or

53 cents a share, compared with the loss of \$556,000 of 15 cents a share in the 1971 six months.

The improved three-month performance at Codex was enough to register a turnaround and the firm cut its six-month loss.

In the quarter, revenues rose to \$863,389 from \$692,495 and earnings, aided by an extraordinary credit of \$27,349, climbed to \$70,519 from the 1971 quarter's loss of \$151,991, or 14 cents a share.

Revenue for the six months declined to \$1.4 million from \$1.9 million, but the loss was cut to \$82,294 or 6 cents a share, from \$298,949 or 28 cents a share.

Graham 9-Month Sales Set Record

GRAHAM, Texas — Nine-month sales and pretax earnings set new records at Graham Magnetics, Inc., but reflecting the exhaustion of tax credits, earnings declined.

Sales for the period ended March 31 soared 22% to \$6.9 million from \$5.7 million in the same period last year.

Income before taxes and spe-

cial items climbed to \$895,348 or 50% above the \$594,517 in the first three periods of 1971.

But bottom line earnings were \$661,348, or 85 cents a share, compared with \$687,102 or \$1.03 in the comparable 1971 period when no taxes were applicable, and when extraordinary items totaled \$372,585.

In the third quarter, sales rose to \$2.5 million from \$1.8 million, with earnings before taxes and special items reaching \$326,857 compared with \$190,495 in the same 1971 period.

Earnings fell to \$173,057 from \$209,460 in the year-ago quarter. This was the first period in which full income tax was applicable. Special credits available for the period totaled \$3,600, while in the same 1971 quarter they totaled \$127,165.

Earnings Reports

COMRESS Year Ended Dec. 31			
	1971	1970	
Shr Ernd	\$0.02	.....
Revenue	4,677,900	\$4,300,100	
aSpec Cred	114,200	88,100	
Earnings	166,500	(744,400)	

a-Grom gain on investments.

CSI COMPUTER SYSTEMS Year Ended Feb. 29			
	1972	1971	
Shr Ernd	\$0.29	\$0.04	
Revenue	3,191,304	1,746,412	
aTax Cred	98,000	10,500	
Earnings	201,335	30,582	

a-Tax loss carryforward.

COMPUTER SERVICES Three Months Ended Jan. 31			
	1972	1971	
Shr Ernd	\$0.05	\$(0.04)	
Revenue	1,195,416	916,273	
Earnings	44,632	(37,154)	
9 Mo Shr	.13	(.01)	
Revenue	3,460,317	2,638,700	
Earnings	111,996	(7,000)	

UNITED DATA CENTERS Year Ended Dec. 31			
	1971	1970	
Shr Ernd	\$0.19	\$0.16	
Revenue	3,321,099	2,956,366	
Earnings	181,755	149,250	

HAZELTINE Three Months Ended March 31			
	1972	1971	
Shr Ernd	\$0.07	.....
Revenue	12,014,000	\$8,547,000	
aSpec Cred	116,000	.....
Earnings	134,000	(213,000)	

a-Consists of \$64,000 tax carryover and \$52,000 gain on property sale.

CLARY Three Months Ended March 31			
	1972	a1971	
Shr Ernd	\$0.07	\$0.55	
Revenue	2,459,000	1,919,000	
Spec Cred	.....	b797,000	
Earnings	103,000	774,000	

a-Restated. b-From sale of anticipated future royalties.

INFORMATION DISPLAYS Year Ended Dec. 31			
	1971	1970	
Revenue	\$1,445,517	\$1,168,464	
Spec Chg	.....	a547,854	
Loss	399,242	1,061,742	

a-Writeoff of deferred research and development costs.

TBS COMPUTER CENTERS Year Ended Feb. 29			
	1972	1971	
Shr Ernd	\$0.46	.....
Revenue	3,889,119	\$3,661,792	
Earnings	225,524	(236,953)	

INTEL Three Months Ended March 31			
	1972	1971	
Shr Ernd	\$0.10	\$0.23	
Revenue	3,831,000	1,829,000	
Spec Cred	a123,000	b491,000	
Earnings	247,000	569,000	

a-Tax loss carryforward credit. b-Gain from sale of "know-how."

TRACOR COMPUTING Year Ended Dec. 31			
	1971	1970	
Shr Ernd	\$0.02	.....
aRevenue	8,236,000	\$7,399,000	
Loss Disc	.....	.....
Op	55,000	512,000	
Spec Chg	593,000	635,000	
Loss	461,000	2,661,000	

a-From continuing operations.

COMPUTEST Nine Months Ended Feb. 29			
	1972	a1971	
Shr Ernd	.....	\$0.41	
Revenue	\$3,095,567	7,655,310	
Spec Chg	b497,000	.....
Earnings	(1,072,749)	385,555	

a-Restated to reflect the acquisition of Integrated Mechanical Systems Inc. on a pooling-of-interests basis. b-From writedown of inventories.

CONRAC Three Months Ended March 31			
	1972	1971	
Shr Ernd	\$0.38	\$0.29	
Revenue	13,835,000	12,015,000	
Earnings	519,000	409,000	

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SEC Bill Seeks 'Total System' Approach

NEW YORK — The capability to undertake a "total systems" approach for the handling and settlement of securities transactions is the goal of the Securities Transaction Processing Act of 1972, proposed by the Securities and Exchange Commission (SEC).

The legislation would permit

the SEC to determine the form of the stock certificate and give the agency broad authority over broker-dealer back-office operations, including computer operations.

The proposed bill would have the commission set standards and procedures for stock-processing firms in performance, operation compatibility with other concerns. It would also allow SEC to set policies for nondiscriminatory access to facilities and standards for the safety of cash and securities.

Another SEC plan to facilitate coordinated quotation facilities has drawn criticism from Rep. John Moss (D-Calif.), chairman of a House Commerce Subcommittee studying the securities industry.

Under the SEC plan for a combined stock transactions tape, the agency would require all

stock exchanges and the National Association of Securities Dealers to make available to computerized stock information systems the daily price and volume reports of completed securities transactions traded in the different markets.

The SEC also proposes to require all stock exchange specialists and over-the-counter market makers to disclose publicly their bid and asked quotations on listed stocks.

Moss said he was troubled by the lack of agreement within the industry on who should operate an eventual computerized composite ticker tape, and said the SEC should "more diligently examine" the structure of a combined tape and the information it should contain.

Quote System Lets Brokers Inspect Different Markets

NEW YORK — Brokers will soon be able to survey a composite picture of prices for stocks traded on more than one exchange with Bunker-Ramo's Market Montage System.

The system retrieves data from a central computer linked to the tickers of the various exchanges and displays the price of the last trade, current bid and asked prices and volume of transactions of stocks listed on different exchanges. It also shows current quotations on the OTC market.

The Market Montage will allow brokers to "go shopping for the best prices for their customers," according to John J. Haberstroh, marketing vice-president.

The Market Montage was presented by the firm as an alternative to proposals for a consolidated market tape that would report all transactions on all stock exchanges.

The system is expected to be available this fall.

Amex System To Link Trading

NEW YORK — The American Stock Exchange has been showing its version of a computerized trading, quotation, order-handling and price-reporting system called Amcode.

The computer-based system would allow market makers or specialists in securities traded on any exchange to submit competitive prices into the system. Orders submitted from brokers' offices could be routed to the market maker offering the best competitive price, developers said.

Also, orders could be automatically executed through the system, with trade data flashed over an as-yet-unborn national stock ticker.

Customers and brokers could still direct orders to the market of their choice, even if that market didn't offer the best price.

Price quotations of specialists would be displayed on terminal screens, so each specialist could see his competitor's quotes.

The estimated cost of a national Amcode system would be about \$25 million to \$30 million, sources indicate.

New Registrations

INTEL CORP., 3065 Bowers Ave., Santa Clara, Calif., semiconductor memory manufacturer, filed to register 37,981 shares of common, to be offered for sale at \$22.63 per share maximum.

SCAN-DATA CORP., 800 E. Main St., Norristown, Pa., optical character recognition equipment manufacturer, filed to register 430,000 shares of common. Proceeds, at \$13 per share maximum, to be used to repay short-term loans and for working capital. The underwriter is G.H. Walker & Co. Inc., 45 Wall Street, New York, N.Y. 10005.

MCI COMMUNICATIONS CORP., 1900 L St. N.W., Washington, D.C., a specialized common carrier, filed to register 3 million shares of common. Proceeds, at \$10 per share maximum, intended for construction of communications systems. The underwriter is Blyth & Co., Inc., 14 Wall St., New York, N.Y. 10005.

DATA RECALL CORP., 142 Oregon St., El Segundo, Calif., add-on memories manufacturer, filed to register 400,000 shares of common. Proceeds, at \$15 per share maximum, to

be used to retire short-term bank loans and for working capital. The underwriter is Oppenheimer & Co., One New York Plaza, New York, N.Y. 10004.

STANDARD COMPUTER CORP., 647 E. Young St., Santa Ana, Calif., a service bureau, filed to register 231,008 shares of common, to be offered for sale at \$1 per share maximum.

WILLIAMSBURG DATA PROCESSING CORP., 7460 Tidewater Drive, Norfolk, Va., a DP service firm, filed to register 150,000 shares of common. Proceeds, at \$5 per share maximum, to be used to acquire a System 3 or equivalent equipment and for working capital. The underwriter is Investors Security Co., 110 Bank St., Suffolk, Va.

DATUM INC., 170 E. Liberty Ave., Anaheim, Calif., manufacturer of peripherals for minicomputers, filed to register 329,654 shares of common. Proceeds, at \$6 per share maximum, intended for research and development and for working capital. The underwriter is Morgan, Olmstead, Kennedy & Gardner Inc., 606 S. Olive St., Los Angeles, Calif. 90014.

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Computerworld Stock Trading Summary

All statistics
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TRADE*QUOTES, INC.
Cambridge, Mass. 02139

CLOSING PRICES THURSDAY, MAY 4, 1972

X C H		PRICES					
		1972 RANGE (1)	CLOSE MAY 4 1972	WEEK NET CHNGE	WEEK PCT CHNGE		
SOFTWARE & EDP SERVICES							
O	ADVANCED COMP TECH	1- 2	1 1/4	0	0.0	N	NASHUA CORP
A	APPLIED DATA RES.	5- 7	5 1/8	- 3/8	-6.8	O	REYNOLDS & REYNOLD
O	APPLIED LOGIC	1- 4	1 1/2	- 1/4	-14.2	O	STANDARD REGISTER
N	AUTOMATIC DATA PROC	72- 91	82 3/4	-1 3/8	-1.6	O	TAB PRODUCTS CO
O	AUTO SCIENCES	1- 1	3/8	- 1/8	-25.0	N	UARCO
O	COMPUTER DIMENSIONS	0- 14	8 1/2	0	0.0	A	WABASH MAGNETICS
O	COMPUTER NETWORK	4- 7	4 1/4	- 3/8	-8.1	N	WALLACE BUS FORMS
COMPUTER SYSTEMS							
N	COMPUTER SCIENCES	8- 10	8 1/4	- 5/8	-7.0	N	BURROUGHS CORP
O	COMPUTER TECHNOLOGY	6- 8	7 1/4	0	0.0	N	COLLINS RADIO
O	COMPUTER USAGE	9- 14	12 1/2	- 1/4	-1.9	N	CONTROL DATA CORP
O	COMP AUTOMOT REPORTS	7- 9	6	0	0.0	O	DATA GENERAL CORP
N	COMPUTING & SOFTWARE	21- 28	22 1/8	- 7/8	-3.8	N	DIGITAL EQUIPMENT
O	COMRESS	1- 3	2 1/8	- 1/8	-5.5	O	DIGITAL INC
O	COMSHARE	5- 10	8 1/4	- 1/8	-1.4	N	DIGITAL SYSTEMS
DATA PROCESSING							
O	DATA AUTOMATION	1- 1	1/4	0	0.0	N	ELECTRONIC ASSOC.
O	DATAMATION SERVICE	1- 1	5/8	0	0.0	A	ELECTRONIC ENGINEER.
O	DATATAB	5- 9	6 3/4	- 1/4	-3.5	N	FOXBORO
O	EDP RESOURCES	4- 8	5 1/4	- 1/2	-8.6	O	GENERAL AUTOMATION
A	ELECT COMP PROG	3- 5	2 3/4	- 3/8	-12.0	N	HEWLETT-PACKARD CO
N	ELECTRONIC DATA SYS.	43- 63	55 1/4	-1 3/8	-2.4	N	HONEYWELL INC
O	INFORMATICS	8- 11	8 1/4	- 1/8	-1.4	N	IBM
INSTRUMENTATION							
O	I.O.A. DATA CORP	1- 2	2 3/8	+ 1/4	+11.7	O	INTERDATA INC
A	ITEL	9- 12	8 3/4	- 3/8	-4.1	O	MICRODATA CORP
O	KEANE ASSOCIATES	4- 7	6	0	0.0	N	NCR
O	KEYDATA CORP	7- 11	10 3/4	0	0.0	N	RAYTHEON CO
O	LOGICON	4- 9	6 3/4	- 7/8	-11.4	N	SPERRY RAND
A	MANAGEMENT DATA	6- 10	7 7/8	- 3/8	-4.5	A	SYSTEMS ENG. LABS
O	NATIONAL CSS INC	8- 17	16	+1 1/2	+10.3	N	VARIAN ASSOCIATES
OPERATING SYSTEMS							
O	NAT COMP ANALYSTS	1- 1	3/4	- 1/8	-14.2	N	VICTOR COMPTOMETER
P	ON LINE SYSTEMS INC	8- 15	12 1/2	+ 1/4	+2.0	N	WANG LABS.
N	PLANNING RESEARCH	14- 17	14 1/2	- 5/8	-4.1	N	XEROX CORP
O	PROGRAMMING METHODS	22- 24	23 1/2	+ 1/2	+2.1	LEASING COMPANIES	
O	PROGRAMMING & SYS	1- 2	1 1/2	0	0.0	A	BOOTHE COMPUTER
O	SCIENTIFIC COMPUTERS	3- 4	2 7/8	- 1/8	-4.1	O	BRESNAHAN COMP.
O	SIMPLICITY COMPUTER	1- 5	4 1/8	+ 1/8	+3.1	O	COMDISCO INC
SOFTWARE SERVICES							
O	SOFTWARE SYSTEMS	1- 3	1 3/8	0	0.0	O	COMPUTER EXCHANGE
O	TBS COMPUTER CENTERS	4- 5	4 3/4	- 3/8	-7.3	A	COMPUTER INVSTRS GRP
O	TRACOR COMPUTING	2- 3	1 3/4	0	0.0	N	DPF INC
O	TYMSHARE INC	7- 10	7 5/8	0	0.0	M	DATRONIC RENTAL
O	UNITED DATA CENTER	5- 8	7 3/4	0	0.0	A	DCL INC
N	UNIVERSITY COMPUTING	19- 26	22 7/8	-1 1/8	-4.6	A	DPA, INC.
A	URS SYSTEMS	6- 9	8 3/4	- 1/4	-2.7	A	GRANITE MGT
O	VORTEX CORP	4- 5	2 1/2	0	0.0	A	GRANITE MGT

PERIPHERALS & SUBSYSTEMS

N	ADDRESSOGRAPH-MULT	34- 42	35 7/8	-1 5/8	-4.3
O	ALPHANUMERIC	1- 2	1/2	- 1/8	-20.0
N	AMPEX CORP	8- 15	7 3/4	- 3/8	-4.6
O	ANDERSON JACOBSON	5- 8	6	0	0.0
O	ATLANTIC TECHNOLOGY	3- 11	6 1/4	- 1/2	-7.4
A	BOLT, BERANEK & NEW	5- 18	14 3/8	- 1/2	-3.3
N	BUNKER-RAMO	9- 14	12	- 7/8	-6.7
A	CALCOMP	19- 25	19 1/8	-1 1/4	-6.1
O	CENTRONICS DATA COMP	11- 39	33 1/2	-2 1/2	-6.9
O	COGNITRONICS	3- 5	2 7/8	+ 1/8	+4.5
O	COMPUTER COMMUN.	3- 7	4 1/4	+ 3/8	+9.6
A	COMPUTER EQUIPMENT	3- 4	3 5/8	+ 1/8	+3.5
O	COMPUTER MACHINERY	7- 13	11 1/4	- 1/2	-4.2
A	COMPUTEST	6- 9	5 1/2	- 1/2	-8.3
O	CONSOL COMPUTER LTD.	1- 2	1 5/8	+1 1/8	+225.0
A	DATA PRODUCTS CORP	5- 7	5 3/8	- 3/8	-6.5
O	DATA RECOGNITION	4- 5	3 3/4	- 1/4	-6.2
O	DATA TECHNOLOGY	3- 5	2 7/8	- 1/8	-4.1
O	DI/AN CONTROLS	0- 8	6 1/4	- 1/2	-7.4
O	DIGITRONICS	3- 4	3	- 3/8	-11.1
N	ELECTRONIC M & M	5- 8	5 1/4	- 1/2	-8.6

O	FABRI-TEK	2- 5	3 7/8	- 5/8	-13.8
O	GENERAL COMPUTER SYS	7- 16	12	- 3/4	-5.8
N	GENERAL ELECTRIC	59- 70	66 1/4	- 3/8	-0.5
N	HAZELTINE CORP	9- 13	10 3/8	- 3/8	-3.4
O	INFOREX INC	28- 47	38 1/2	-1 1/2	-3.7
O	INFORMATION DISPLAYS	3- 5	2 3/4	- 1/4	-8.3
O	MANAGEMENT ASSIST	1- 2	1	0	0.0

N	MEMOREX	27- 38	31 1/2	-1 7/8	-5.6
A	MILGO ELECTRONICS	17- 39	35 1/2	-1 1/8	-3.0
N	MOHAWK DATA SCI	20- 27	24 1/2	-1 1/4	-4.8
O	OPTICAL SCANNING	7- 16	12 1/2	+ 1/2	+4.1
O	PERTEC CORP	11- 17	10 1/2	-1 3/4	-14.2
O	PHOTON	7- 15	12 1/2	- 3/4	-5.6
A	POTTER INSTRUMENT	15- 21	16 1/8	- 3/4	-4.4

O	PRECISION INST.	7- 13	11 3/4	+ 3/4	+6.8
O	RECOGNITION EQUIP	10- 15	9 7/8	- 3/4	-7.0
N	SANDERS ASSOCIATES	16- 21	15 5/8	-1 1/8	-6.7
O	SCAN DATA	9- 13	11 1/8	- 5/8	-5.3
O	STORAGE TECHNOLOGY	17- 27	19 5/8	-1 7/8	-8.7
O	SYCOR INC	7- 10	7	- 1/4	-3.4
O	TALLY CORP.	8- 13	8 1/2	-1 1/8	-11.6

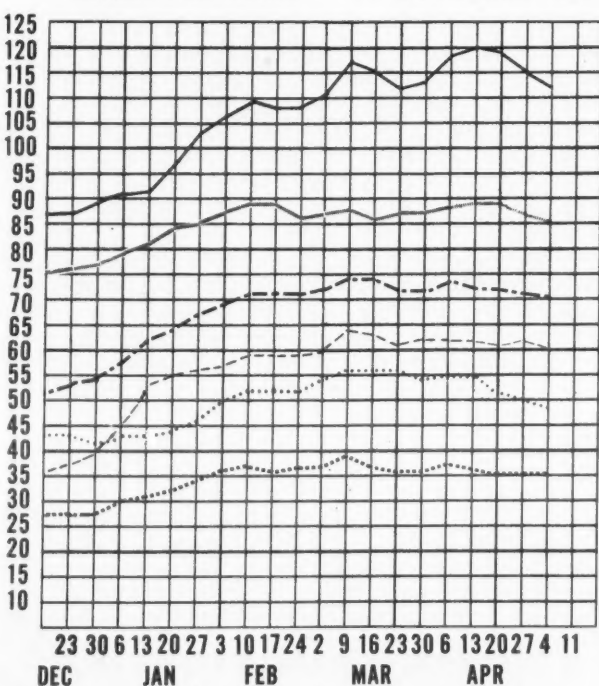
N	TEKTRONIX INC	34- 50	46 1/2	-1 3/8	-2.8
N	TELEX	10- 15	10	- 1/4	-2.4

SUPPLIES & ACCESSORIES

O	BALTIMORE BUS FORMS	6- 9	8 1/2	+ 1/4	+3.0
A	BARRY WRIGHT	9- 13	10 3/4	- 1/8	-1.1
A	DATA DOCUMENTS	17- 26	24	-1 1/8	-4.4
O	DUPLEX PRODUCTS INC	12- 16	12 5/8	- 1/8	-0.9
N	ENNIS BUS. FORMS	7- 9	8 1/8	- 1/8	-1.5
O	GRAHAM MAGNETICS	15- 27	19 1/2	-1 7/8	-8.7
O	GRAPHIC CONTROLS	12- 15	14	- 3/8	-2.6
N	3M COMPANY	129-149	140	- 5/8	-0.4
O	MOORE BUS. FORMS	42- 48	47 1/4	+ 1/4	+0.5

Computer Stocks Trading Index

— Computer Systems — Software & EDP Services
 Peripherals & Subsystems Leasing Companies
 — Supplies & Accessories — CW Composite Index

Earnings
Reports

SYS COMPUTER		
Year Ended Dec. 31		
	1971	1970
Revenue	\$804,612	\$351,201
Spec Item	a750	d128,759
Earnings	2,640	(506, 026)

a-Credit. d-Debit.

TEKTRONIX		
Four Months Ended March 4		
	1972	1971
Shr Ernd	\$.45	\$.33
Revenue	49,122,000	43,097,000
Spec Cred	835,000	.....
Earnings	3,683,000	2,662,000

COMPUTER INSTRUMENTS		
Year Ended Dec. 31		
	1971	1970
Revenue	\$3,642,094	\$4,774,808
Tax Cred	.....	650,000
Loss	387,956	773,214

DATA GENERAL		
Three Months Ended March 11		
	1972	1971
Shr Ernd	\$.31	\$.13
Revenue	6,325,000	2,784,000
Earnings	815,000	308,000
6 Mo Shr	.56	.24
Revenue	11,619,000	5,012,000
Earnings	1,474,000	528,000

COMPUTER CONSOLES		
Year Ended Dec. 31		
	1972	a1971
Revenue	\$1,578,683	\$463,165
Spec Chg	b142,815	.....
Loss	879,249	1,286,895

a-Pro forma on operating lease basis for 1971. b-Cumulative effect of prior year of change in accounting principle.

DATA 100		
Year Ended Dec. 31		
	1971	1970
Revenue	\$3,884,376	a\$1,487,026
Loss	4,445,109	3,475,422

a-Restated.

ITEL		
Year Ended Dec. 31		
	1971	a1970
Shr Ernd	.....	\$1.10
bRevenue	101,180,000	81,285,000
cLoss Disc	.....	.....
Op	7,273,000	1,029,000
Spec Item	d7,708,000	e1,519,000
Earnings	(5,901,000)	7,352,000

a-Restated to include acquisition. b-From continuing operations. c-Pri-
 marily to discontinued office product
 manufacturing and marketing opera-
 tion. d-Debit; includes \$12,076,000
 writeoff of related goodwill and pro-
 vision for closing costs of \$10 million
 reduced by fair market value of com-
 pany's investment in Diablo Systems
 Inc. of \$12 million, representing the
 excess over cost of proceeds to be
 received from sale to Xerox Corp.
 e-Credit; tax credit from carryfor-
 ward of prior year losses of Informa-
 tion Storage Systems Inc., acquired
 in April 1971.

ALANTHUS		
Six Months Ended Feb. 29		
	a1972	b1971
Shr Ernd	\$.69	.....
Revenue	1,362,412	.....
Spec Cred	c49,599	.....
Earnings	363,945	.....


a-Final report, due to changes in ac-
 counting methods for leased under-
 writing income and deferred income
 taxes. b-Comparable figures not avail-
 able due to a change in the com-
 pany's business in May 1971. c-Tax
 loss carryforward credit of \$79,472,
 less special charge of \$29,873. Fully
 diluted share earnings were 56 cents.

DELTA DATA SYSTEMS		
Nine Months Ended Dec. 26		
	1971	1970
Revenue	\$1,128,637	\$592,844
Loss	a364,940	1,084,740

a-Includes a \$100,000 reserve for anticipated inventory adjustment due to a manufacturing model change.

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